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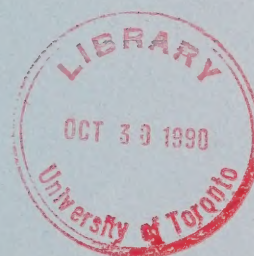
VOLUME: 244

DATE: Monday, October 15, 1990

BEFORE:

A. KOVEN Chairman

E. MARTEL Member



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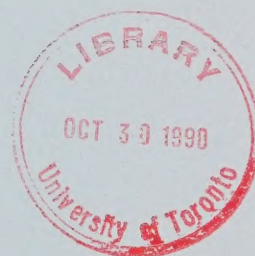
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HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental
Assessment for Timber Management on Crown
Lands in Ontario;

- and -

IN THE MATTER of an Order-in-Council
(O.C. 2449/87) authorizing the
Environmental Assessment Board to
administer a funding program, in
connection with the environmental
assessment hearing with respect to the
Timber Management Class
Environmental Assessment, and to
distribute funds to qualified
participants.

Hearing held at the offices of the
Ontario Transport Board, Britannica
Building, 151 Bloor Street West, 10th
Floor, on Monday, October 15th, 1990,
commencing at 10:00 a.m.

VOLUME 244

BEFORE:

MRS. ANNE KOVEN
MR. ELIE MARTEL

Chairman
Member

A P P E A R A N C E S

MR. V. FREIDIN, Q.C.)	MINISTRY OF NATURAL
MS. C. BLASTORAH)	RESOURCES
MS. K. MURPHY)	
MR. B. CAMPBELL)	
MS. J. SEABORN)	MINISTRY OF ENVIRONMENT
MS. B. HARVIE)	
MR. R. TUER, Q.C.)	ONTARIO FOREST INDUSTRY
MR. R. COSMAN)	ASSOCIATION and ONTARIO
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MR. P.R. CASSIDY)	ASSOCIATION
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I N D E X O F P R O C E E D I N G S

<u>Witness:</u>	<u>Page No.</u>
<u>THOMAS C. HUTCHINSON</u> , Recalled	43825
Cross-Examination by Mr. Freidin	43825
SCOPING SESSION	44006

I N D E X O F E X H I B I T S

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
1426	Text entitled: Fundamentals of Ecology, Third Edition, authored by Odum, published by W.B. Saunders Company, dated 1971.	43827
1427	Two-page letter dated September 24th, 1990 from Ms. Paton Lodge Lindsay to Mr. Lannin, MNR, Blind River District, with four-page handwritten correspondence attached.	43963

1 ---Upon commencing at 10:10 a.m.

2 MADAM CHAIR: Good morning. Please be
3 seated.

4 Good morning, Mr. Freidin. Good morning,
5 Dr. Hutchinson.

6 THE WITNESS: Good morning.

7 THOMAS C. HUTCHINSON, Recalled

8 CROSS-EXAMINATION BY MR. FREIDIN:

9 Q. Dr. Hutchinson, I would just like to
10 start off and see whether you would agree with two
11 definitions; one is the definition of ecology, and one
12 is a definition of forest ecology, and I'm reading
13 these from the McGraw Hill Dictionary of Scientific and
14 Technical Terms, they are very short.

15 Would you agree that a study of the
16 inter-relationships which exist between their organisms
17 and their environment would be an accurate definition
18 of ecology?

19 A. Yes.

20 Q. Also known as environmental biology
21 is what the definition also says.

22 A. It's -- I think that would be --
23 there's a different concept for environmental biology,
24 but certainly for ecology that seems to be a good
25 definition.

1 Q. All right. The definition they have
2 for forest ecology is the science that deals with the
3 relationship of forest trees to their environment, to
4 one another, and to other plants and to animals in the
5 forest. Would you agree with that definition?

6 A. Yes.

7 Q. Could we agree, therefore, that
8 ecology is an extremely broad subject area that in
9 layman's -- the layman might say it's the relationship
10 of everything to everything else?

11 A. You would have to narrow it a bit
12 from that, but I agree, it's a very broad area.

13 Q. And that forest ecology, would you
14 agree, that that is also a broad area that would
15 involve the interactions between soils, plants and
16 wildlife?

17 A. Yes.

18 Q. Would you agree that the components
19 which make up the entire forest ecosystem can and are
20 affected by natural disturbance, by human disturbance,
21 and by climate?

22 A. Yes.

23 Q. Dr. Hutchinson, are you -- well, I
24 have in front of me a book entitled: Fundamentals of
25 Ecology by Odum, Third Edition. Are you familiar with

1 this text?

2 A. Yes.

3 Q. And would you regard it as a
4 recognized authoritative text on ecology?

5 A. Oh yes.

6 Q. And I believe I gave you a copy of
7 Chapter 1 of that text to review over the weekend.

8 A. Yes.

9 MR. FREIDIN: Madam Chair, I would like
10 to mark as the next exhibit, Chapter 1 from the text:
11 Fundamentals of Ecology by Odum, O-d-u-m, Third
12 Edition, published by W.B. Saunders Company.

13 MADAM CHAIR: In which year?

14 MR. FREIDIN: 1971.

15 MADAM CHAIR: That will be Exhibit 1426.

16 ---EXHIBIT NO. 1426: Text entitled: Fundamentals of
17 Ecology, Third Edition, authored
18 by Odum, published by W.B.
Saunders Company, dated 1971.

19 MR. FREIDIN: What's the number?

20 MS. SWENARCHUK: Is it called
21 Fundamentals of Ecology?

22 MR. FREIDIN: Fundamentals of Ecology.

23 Q. Would you turn to page 6 of Exhibit
24 1426, please, page 6 of the text. There's a heading
25 there, the Subdivisions of Ecology, and I would like to

1 direct your attention to the last full paragraph under
2 that heading which reads as follows:

3 "Subdivisions in ecology, as in any other
4 subject, are useful because they
5 facilitate discussion and understanding
6 as well as suggest profitable ways to
7 specialize within the field of study.

8 From the brief discussion in this section
9 we see that one might concentrate on
10 processes, levels, environments,
11 organisms, or problems and make valuable
12 contributions to the overall
13 understanding of environmental biology."

14 Dr. Hutchinson, could you explain,
15 perhaps expand on what that really means, what the
16 significance of that is?

17 A. Well, I can only tell you of course
18 from my point of view, but what he's saying is that one
19 can come about -- upon the study of ecology in many
20 different ways. These would be legitimate. One can
21 look at levels of processes, this might be studies of
22 photosynthesis or nutrient cycling or respiratory
23 processes, lignin decomposition, things of this kind,
24 which would be important in any ecosystem.

25 Q. And that would be an example of

1 processes?

2 A. Yes.

3 Q. Yes.

4 A. Levels would presumably mean
5 organizational levels, and this could be composed of,
6 well for example, soil microbial - soil microbes would
7 be one level, another level might be forest floor,
8 herbaceous species or the feather mosses, or it could
9 be soil microfauna, the small animals in the soil, or
10 it could be higher plants, various sub --
11 quasi-taxonomic units.

12 Q. Higher plants such as...?

13 A. Higher plants. Well, they could be
14 any of your trees, they could be your herbaceous
15 species, or you could be working within taxonomic units
16 which might be, for example, spruce or you might be
17 working, for example, within the ericaceae, the
18 blueberry family.

19 Q. Okay.

20 A. Do you want me to go through all of
21 these?

22 Q. Can you -- what about environments,
23 one can concentrate on environments.

24 A. Well now, that might mean some
25 subdivisions into geographic regions which would be

1 determined by combinations of climates, microclimates
2 and soil interactions, or it might mean environments
3 within a forest, for example, where you're looking at
4 humidity, temperature, et cetera, within the forest
5 floor or within the soil.

6 So there could be -- you could have large
7 scale ones which would be regional climates, all the
8 way down to quite small microhabitats.

9 Q. You indicated earlier that forest
10 ecology was broad. Would you agree that one can
11 specialize in the area of wildlife biology as a subset
12 of forest ecology?

13 A. Yes.

14 Q. And one can even specialize within
15 that particular subset of moose biology to become more
16 refined to look at something such as the type of foods
17 that they eat?

18 A. Yes.

19 Q. And at what time of the year.

20 A. Are you asking if that's a legitimate
21 ecological study?

22 Q. Yes.

23 A. Yes.

24 Q. All right. You used the phrase
25 anthropogenic stresses in your evidence.

1 A. Mm-hmm.

2 Q. Simply put, does that mean stresses
3 which are caused by man?

4 A. Yes.

5 Q. And so in this hearing we have heard
6 about disturbances which have been -- can be created
7 through timber management activities, that's the
8 building of roads, harvesting, renewing the forest and
9 carrying out maintenance operations, those would be
10 anthropogenic stresses?

11 A. Those would be some examples, yes.

12 Q. In addition, pollutants would be a
13 different kind of anthropogenic stress?

14 A. Right.

15 Q. The greenhouse effect would be the
16 result of other types of anthropogenic stresses again?

17 A. Yes.

18 Q. Now, Mr. Cassidy reviewed with you
19 what the focus of your academic and professional career
20 has been, and I think you indicated that it had -- one
21 of the primary interests was the addition of pollutants
22 to the environment; is that correct?

23 A. Yes, that's right.

24 Q. And I think you indicated that over
25 the last five years that you have been interested in

1 forest decline?

2 A. That's right, yes.

3 Q. In terms of forest decline, has your
4 interest in forest decline been related to the issue as
5 to whether there is any cause/effect relationship
6 between the decline which is giving rise to the concern
7 and acid precipitation or the addition of heavy metals
8 to the environment?

9 A. To an extent, yes. It's been mainly
10 concerned with attempting to find out, first of all,
11 under what circumstances and in what locations decline
12 is occurring; and, secondly, what the mechanism might
13 be.

14 Q. Are you doing this work on your own
15 or is in this conjunction with experts in different
16 fields?

17 A. Well, it's both.

18 Q. It's both.

19 A. I mean, we have our own studies and
20 we connect with other groups that are working on the
21 problem too.

22 Q. All right. But in terms of your
23 specific input to those studies, when you actually get
24 involved doing specific work, am I correct that the
25 focus of your work is looking at that acid

1 precipitation or heavy metal forest decline connection?

2 A. No, you're putting far too much
3 emphasis on heavy metals and acid precipitation.

4 Q. All right.

5 A. Unfortunately, that's a common kind
6 of misconception that people -- that people seem to
7 have about forest decline. I think we're in the stage
8 of trying to establish what the circumstances are and
9 the press and maybe even yourself have jumped ahead and
10 assumed that it's acid precipitation.

11 Q. But I'm not concerned about what the
12 press have said or what people generally think about,
13 I'm concerned or interested in knowing what your
14 specific involvement is in looking at that subject.

15 A. Okay.

16 Q. In other words, if there are
17 different experts looking at it, I would assume that
18 they would apply their expertise to that problem, and I
19 assume that you have done the same, and I'm trying to
20 get some better understanding as to what it is your
21 expertise has been -- is?

22 A. We have been focussing on the soil
23 and soil root interactions and, to a lesser extent, on
24 the foliage atmospheric interaction.

25 Q. And when you're talking about

1 interactions with the root, you're talking about
2 interactions of what with the root?

3 A. Nutrient uptake, root health, soil
4 chemistry, functioning of -- well, pathogens, soil
5 pathogens, soil mycorrhizae, these fungal associations
6 with root systems, basically the plant likes of root
7 processes and root soil interactions that might be
8 involved in this.

9 Q. Now, looking at the areas of acid
10 precipitation--

11 A. Right.

12 Q. --and again addition of heavy metals
13 to the environment, have you done laboratory research
14 in that area?

15 A. Oh yes, yes.

16 Q. Have you done field studies in that
17 area?

18 A. Yes.

19 Q. Have you made observations regarding
20 the effects of pollutants on the environment over time
21 in that context?

22 A. Yes.

23 Q. Have you published peer reviewed
24 articles in relation to that subject?

25 A. Yes.

1 Q. You indicated that you had made
2 observations regarding the effect of pollutants on the
3 environment over time. Do you believe that making such
4 observations are important in terms of your
5 understanding that particular aspect of forest ecology?

6 A. Yes.

7 Q. Why?

8 A. Long-term studies are very important
9 I think. Well, some of the soil -- some of the forest
10 processes are rather long-term processes and we need to
11 be, particularly when we're dealing with trees, be able
12 to have some idea of how things might operate over time
13 under different annual climatic regimes and things of
14 this kind.

15 Q. Is the study of fire and its effect
16 on the environment a branch of forest ecology?

17 A. Yes.

18 Q. Would you agree that there are people
19 who have dedicated their academic and professional
20 career to fire science in the forest ecosystem?

21 A. Oh yes.

22 Q. You haven't?

23 A. No, I haven't dedicated it, no.

24 Q. Would you agree that the same is true
25 of insect and disease and their effects on the forest

1 ecosystem?

2 A. Oh yes.

3 Q. Would you agree that the same could
4 be true for man-made disturbance of timber management
5 as I defined it for you earlier?

6 A. Mm-hmm, yes.

7 Q. Am I correct that you don't fall into
8 that category?

9 A. Of having spent my career looking at
10 timber management, no, that's correct. That's quite
11 correct.

12 Q. Is it a fair assumption, Dr.
13 Hutchinson, that the articles that you have published
14 which have dealt with the effect of the pollution
15 inputs on plants have addressed the issue primarily
16 from a toxicity point of view?

17 A. Well, some of them have, but many of
18 them would be plant physiology, tree physiology and
19 many of them would be purely nutrient ecology, but
20 certainly some of them, where we have dealt with heavy
21 metals, or where we've dealt specifically with some
22 impacts of acid precipitation or oil spills and things,
23 those could be categorized in general terms as
24 toxicology.

25 Q. Have you done any studies or written

1 any papers published in peer reviewed publications
2 regarding the effect of fire disturbance on the forest
3 ecosystem?

4 A. We have written -- I have to look at
5 my --

6 Q. When you say we, does that mean you?

7 A. It means I'm involved, yes.

8 Q. Well, have you personally?

9 A. Have I personally--

10 Q. Yes.

11 A. --written any papers that involves
12 fire and studies fire?

13 Q. Regarding the effect of fire
14 disturbance on the forest ecosystem? I'm talking about
15 studies or written any papers published in peer
16 reviewed journals.

17 A. Yes.

18 Q. All right. List them for me, please.

19 A. Well, if somebody can kindly just
20 give me my CV, I will point out the ones with oil
21 spills in the Northwest Territories.

22 Q. Well, I was asking about the effect
23 of fire disturbance.

24 A. Yes, they're comparisons with.

25 Q. I see. All right.

1 MS. SWENARCHUK: This is I believe
2 Exhibit 1407.

3 THE WITNESS: Now, I will have to get the
4 papers out to see which particular one dealt with the
5 fire aspects, but I can give you a general idea and
6 then you can check them if you like.

7 MR. FREIDIN: Q. Well, let's just see
8 where you start.

9 A. Okay. Freedman and Hutchinson, 1976.

10 Q. Which page?

11 A. This is page 17 of my CV.

12 Q. Page 17. Yes. Experimental Crude
13 Oil Spills on Canadian, the Lower Arctic Tundra.

14 A. That's right, plant community changes
15 and that should be Canadian Journal of Botany.

16 Q. All right. And how does that get us
17 into the area of fire ecology?

18 A. It makes comparisons between the
19 effects of oil spills in terms of effects on depth of
20 permafrost active layer, development in permafrost
21 regions of the boreal forest, it's actually black
22 spruce region.

23 Q. Well, the lower Arctic tundra --

24 MS. SWENARCHUK: Excuse me.

25 MR. FREIDIN: Q. The lower Arctic

1 tundra, are you saying that's the boreal forest?

2 MS. SWENARCHUK: Mr. Freidin, would you
3 allow him to answer the question fully before you put
4 your next question, please.

5 THE WITNESS: Well, let me -- I said I
6 was going to have to go through these and see which
7 specific ones there were. Okay.

8 If we take the one at the bottom of that
9 page, that is Hutchinson and Freedman, 1975, Effects of
10 Experimental Crude Oil Spills on Taiga and Tundra
11 Vegetation in the Canadian Arctic. Maybe that top one
12 is entirely tundra, I mean, I would have to check it.

13 Q. And if it was tundra --

14 A. The one at the bottom would be
15 concerned with black spruce as well as tundra. The 178
16 on page 16, Hutchinson and Freedman, the Effects of
17 Crude Oil and Diesel Oil Spills on Sub-Arctic
18 Vegetation, some of these were looking at the effects
19 on micrometeorology and on heat fluxes.

20 Q. If I just might interrupt for one
21 moment, Dr. Hutchinson. When you did those papers and
22 you said that in some of them there may have been a
23 comparison between the spills and fire, did you -- for
24 the comparisons did you rely on the studies of others
25 for the effects of fire?

1 A. No, we examined that also. We looked
2 at fires in the Northwest Territories.

3 Q. Is the Northwest Territories, where
4 you did this work, the boreal forest?

5 A. Yes.

6 Q. You're sure of that.

7 A. Western boreal forest.

8 Q. Exactly where was it, please?

9 A. Well, Norman Wells and Inuvik and the
10 forest is Inuvik. It's right on the transition
11 between the tundra and the taiga. So I'm talking about
12 Inuvik in the boreal forest, Norman Wells and various
13 sites in the Territories. We flew into several
14 locations to do this.

15 Q. Thank you.

16 A. Actually short of getting those
17 papers out, I mean, I can only give you kind of guess
18 answers to which ones deal with that particularly but,
19 I mean, if you want me to dig them out, we could do it.

20 Q. I will think about it.

21 A. There were several reports to the
22 Department of Indian and Northern Affairs which
23 detailed that in greater depth.

24 Q. Have you ever done any studies or
25 written any papers published in peer reviewed journals

1 regarding the effects of timber management practices on
2 the forest ecosystem?

3 A. No.

4 Q. Have you ever made -- well, other
5 than the situation you described with the oil spills
6 and perhaps fire, have you ever made observations in the
7 field over time to assess whether any of the effects or
8 observations you made might be connected to or be the
9 effect of fire?

10 A. Sorry, I don't think I understand
11 your question.

12 Q. All right. You indicated that you
13 did a study where you looked at oil spills and the
14 article talked about how that compared to the results
15 of fire; is that right?

16 A. Yes, right.

17 Q. And you have indicated that as part
18 of your work in the area of pollution you would make
19 observations out in the field over time?

20 A. Yes.

21 Q. I guess the work you did in the
22 Sudbury area would be an example of that?

23 A. Right.

24 Q. And my question was: Have you ever
25 made observations in the field over time in a similar

1 way to assess whether anything that you observed, the
2 effects that you were observing were connected to or
3 were the effect of fire?

4 A. No, no.

5 Q. Could you refer to Odum again and
6 this time to page No. 5. We have at the top a Figure
7 1.2 entitled: Levels of Organization Spectrum.

8 Now, in lay terms, Dr. Hutchinson, does
9 this figure provide a breakdown of an ecosystem
10 starting at the largest or most gross level on the
11 right, called the ecosystem, down to the smallest
12 constituent parts on the left, being individual genes?

13 A. That would be a breakdown of the
14 organisms that make up the biota of the ecosystem. It
15 doesn't, of course, indicate the physical components of
16 the system, but that will be a reasonable breakdown of
17 the biological components of your ecosystem.

18 Q. And when you say it doesn't provide
19 the physical -- did you say the physical components or
20 the physical breakdown?

21 A. Well, physical components of the
22 system.

23 Q. Such as -- those would be...?

24 A. All of the things like atmosphere,
25 soil, the physical components of climate, temperature,

1 humidity, so on.

2 Q. This gives you the breakdown --

3 A. In fact it says, if you look at
4 right-hand side it says biosystems, so that's really
5 describing the breakdown categorization of different
6 levels of biological organization.

7 Q. So this would be the biotic
8 community?

9 A. Yes.

10 Q. Okay. Now, could I refer you to the
11 right-hand column starting with the -- down about the
12 middle, I want to see whether you agree with the
13 passage that I'm going to read to you. It starts in
14 the middle, it says:

15 "When we consider..."

16 A. Mm-hmm.

17 Q. "When we consider the unique
18 characteristics which develop at each
19 level...", I take it they're talking
20 about the level of the biotic community in the figure,
21 "...there is no reason to suppose that
22 any level is any more difficult or any
23 easier to study quantitatively. For
24 example, growth and metabolism may be
25 effectively studied at the cellular level

1 or at the ecosystem level by using
2 technology and units of measurement of a
3 different order of magnitude."

4 Do you agree with that comment?

5 A. Yes. Generally speaking, I think I
6 do, yes.

7 Q. "Furthermore, the findings at any one
8 level aid in the study of another level,
9 but never completely explain the
10 phenomena occurring at that level."

11 Would you agree with that?

12 A. Well, I agree with the first half of
13 the sentence. "Never completely explain the phenomena
14 occurring at that level". I don't quite know what to
15 think about that, but I certainly agree with the first
16 half.

17 Q. Well, you indicated that this is a
18 recognized authoritative text on ecology, it's called
19 The Fundamentals of Ecology. Are you saying you don't
20 understand what that means, or you disagree with it?

21 A. I might disagree with it, I don't
22 understand the context it's coming from, and I will
23 have to read the thing through to see.

24 Q. Did you read the Chapter 1 that I
25 gave you?

1 A. Yes.

2 Q. And you're saying then that Chapter 1
3 doesn't give you the context that's necessary for you
4 to understand that?

5 A. No, I will have to read it again
6 right now, if you want me to do that, to see if I agree
7 with the second part based on what he said.

8 Q. All right. Would you do that.

9 A. The fact that it's an authoritative
10 textbook doesn't mean that you agree with word for word
11 and line for line.

12 Q. No, and that's why I asked you
13 whether you understood it or whether --

14 A. Right.

15 Q. And if you understood it, whether you
16 agreed.

17 A. Okay, I'll read it. I'll read back a
18 bit if that's what you want me to do.

19 Q. I'm sorry?

20 A. I will read back a bit, if you want
21 me to do that, and see if I can --

22 Q. Can you do that now?

23 A. Yeah, I will do it right now.

24 Q. All right.

25 MADAM CHAIR: Mr. Freidin, are we going

1 to spend much more time on Odum's Chapter on --

2 MR. FREIDIN: Oh, I think in fact this is
3 the last passage I'm going to put to him.

4 MADAM CHAIR: Okay, good.

5 THE WITNESS: Yes, I think I actually
6 agree with him.

7 MR. FREIDIN: Q. "This is an important
8 point because persons sometimes contend
9 that it is useless to try to work on
10 complex populations in communities when
11 the smaller units are not yet fully
12 understood."

13 If I might just, to speed this up, go
14 down to the last four lines on that page, it says:

15 "In other words, not all attributes of
16 a higher level are predictable if we know
17 only the properties of the lower level.
18 Just as the properties of water are not
19 predictable, if we know only the
20 properties of hydrogen and oxygen; so the
21 characteristics of ecosystems cannot be
22 predicted from knowledge of isolated
23 populations, one must study the forest
24 (i.e., the whole) as well as the trees
25 (i.e., the parts)."

1 Do you agree with that?

2 A. Absolutely.

3 Q. Would you agree, Dr. Hutchinson, that
4 your work falls into Odum's chart at the organism level
5 and down, or perhaps the lower population level and
6 down?

7 A. Well, I think most of my work falls
8 from the ecosystem level down -- ecosystem population
9 organismic systems, and then we tend to skip a couple
10 and I have done some work at the genetic systems level.

11 Q. The studies on cabbage for instance
12 that you did, that would be at the organism level?

13 A. Yes.

14 Q. The studies that you would have done
15 on algae would be on the organism level?

16 A. While many of the specific studies
17 have been at the organism level, some have been at the
18 population level in our view.

19 Q. Have you -- are there peer reviewed
20 articles referred to in your CV which deal with things
21 at the community or the ecosystem level of organization
22 which deal with something other than the addition of
23 pollutants?

24 A. Well, there's a lot of studies that I
25 have done that don't deal with addition of pollutants,

1 but now you're asking if those are at the ecosystem
2 level?

3 Q. Yes.

4 A. Gosh. Yes, I think all of the
5 ecosystem level ones have involved some kind of human
6 intervention.

7 Q. Pollutants?

8 A. All the ecosystems levels that I've
9 published on have included some human intervention.

10 Q. The human intervention being
11 pollutants though?

12 A. Hmm, being pollutants...

13 Q. I went through there and I couldn't
14 find any, and I'm asking you because I'm not the
15 expert.

16 A. We have made some comparisons in one
17 paper, that's Regaire and Rappo -- or Rappo and Regaire
18 and myself.

19 Q. All right. So there may be one out
20 of all the papers here that dealt with a review of --
21 dealt with the community or ecosystem level of
22 organization in an area other than pollutants?

23 A. Well, there's -- I've got a couple of
24 chapters on -- a book which is called Ecological
25 Consequences -- well, let me just find the books.

1 I edited and organized with Four Scope,
2 which is a non-governmental United Nations group, the
3 study of the Ecological Consequences of Nuclear War and
4 that was a very large international group, and I wrote
5 some of the chapters in that book which compared
6 different ecosystems and the effects of cold and
7 darkness and things of that kind. There's parallels to
8 the nuclear winter scenario. I don't know if that
9 helps.

10 Q. Well, it helps.

11 A. Yeah.

12 Q. That article and the other article
13 you mentioned then are the articles which you have
14 published in peer review journals regarding the
15 community or ecosystem level of organization, effects?

16 A. Yes.

17 Q. All right, thank you.

18 Would you agree that if you want to make
19 inferences or conclusions at the forest level that you
20 would have to have an understanding of the components
21 of the various systems, the levels of organization
22 below?

23 A. If you want to make inferences about
24 what, about anything?

25 Q. Yes. Well, no, I asked a question.

1 If you want to make inferences or conclusions at the
2 forest level, would you agree that you would have to
3 have an understanding of the components of the system,
4 the various levels of organization up to the forest
5 level?

6 A. If you wanted an understanding of the
7 forest, you have to have an understanding of the
8 systems.

9 Q. Yes. Do you also agree that it would
10 be important to have observations over time of the
11 forest as a whole?

12 A. It would depend entirely on the
13 question you're asking. These are very general
14 questions you're asking so, you know, there may be
15 perfect and legitimate conclusions can be drawn from
16 one-shot studies. There's many examples of them.

17 Q. Is that the sort of thing that you --
18 the point that you were making. Would you turn to Tab
19 11, it's an article that you wrote -- all right, you
20 don't have tabs. It's your article, Dr. Hutchinson,
21 Responses of Five Species of Conifer Seedlings to a
22 Aluminum Stress. Do you have that? It's one of your
23 references.

24 A. Okay.

25 MS. SWENARCHUK: References or CV?

1 MR. FREIDIN: No, one of the sources in
2 the source book, I'm sorry when I say references.

3 MS. SWENARCHUK: Which volume?

4 MR. FREIDIN: I have no idea. I put mine
5 together -- Responses of Five Species of Conifer
6 Seedlings to Aluminum Stress.

7 Madam Chair, if I have mine put together
8 differently, at the break I will change it.

9 MS. SWENARCHUK: That would be in source
10 book for Panel 1, Madam Chair. Alphabetized under
11 Hutchinson.

12 THE WITNESS: I will be happy just to
13 answer your question without finding the article, if
14 that's fine. It might save some time.

15 MADAM CHAIR: Who's the co-author?

16 MR. HUFF: It's Hutchinson, Bozic and
17 Munos-Vega.

18 MADAM CHAIR: Thank you.

19 MR. MARTEL: What's the title again,
20 Effects --

21 MS. SWENARCHUK: Responses of Five
22 Species of Conifer Seedlings to Aluminum Stress.

23 DR. HUTCHINSON: Yes, I have got it.

24 MR. FREIDIN: Q. And this was a study,
25 as I understand it, where you were reporting the

1 results of adding some various range of aluminum
2 concentrations in an experimental setting to various
3 sand cultures?

4 A. Right, yes.

5 Q. And you were measuring pH effects,
6 the result of that, what the effect of that was on pH?

7 A. Well, we were particularly interested
8 in effect of altering the cal -- on growth, but pH was
9 measured, yes.

10 Q. Okay. You state at the very last
11 paragraph of that article, page 293:

12 "While this study is not extrapolatable
13 directly to field conditions, it does
14 suggest that red spruce may be an
15 aluminum sensitive species and that white
16 pine is much more tolerant. The field
17 situation is enormously more complex than
18 greenhouse and sand culture experiments,
19 not least in the addition of soil
20 chemistry, chemical complexity, spacial
21 gradient and mycorrhizal pathogen and
22 microbial interactions, et cetera. Cost
23 is also essential in concluding anything
24 about mature trees response to stress
25 from seedlings in pots."

1 That's sort of the point you were making
2 about the one-shot study really can't tell you what's
3 going to happen?

4 A. No, but that was written suitably
5 cautiously.

6 Q. Am I correct, Dr. Hutchinson, that
7 any knowledge that you have regarding silvicultural
8 operations, their purpose and their development is not
9 based on first-hand decision-making in the field, by
10 that, I mean making silvicultural prescriptions
11 observing and/or measuring their results?

12 A. That's right.

13 Q. Have you ever taught in the area of
14 fire management and stand dynamics?

15 A. Have I ever taught?

16 Q. Have you ever taught in the area of
17 fire management and stand dynamics?

18 A. No.

19 Q. Have you ever been involved either
20 individually or as a member -- I believe you've
21 answered that. Have you ever studied fire behaviour in
22 the forest setting, the boreal or otherwise, other than
23 the two situations where you said that your paper
24 referred to them?

25 A. Well, we have looked at the effects

1 of -- long-lasting effects of fire in a boreal setting
2 on succession and on effects on permafrost.

3 Q. Those are the studies that we talked
4 about earlier?

5 A. Yes, but I didn't want you to pass by
6 them without them getting a mention because they're
7 significant.

8 Q. Have you ever been involved in the
9 development of models to predict fire behaviour?

10 A. No.

11 Q. Do you agree that having the
12 experience that I have referred to, most of which you
13 indicated that you did not have, would increase one's
14 expertise in the area of fire ecology and the effects
15 of fire in the forest?

16 A. Well, it would help in the directions
17 in which you'd studied. It would -- for example,
18 people have studied fire frequency, they have studied
19 stand dynamics, they have studied the ability of
20 species to survive fire, to regenerate after fire, and
21 that is all very useful, that indeed helps, and then
22 they publish and people read it.

23 Q. And having that sort of experience,
24 would increase one's expertise in that area of fire
25 ecology; would you agree?

1 A. Certainly.

2 Q. Would you agree or disagree, Dr.

3 Hutchinson, that although you have an understanding of
4 the comparisons between fire and silviculture, that
5 someone whose career specialized in fire science and
6 silvicultural would have more expertise regarding the
7 relationship between fire and silvicultural activities
8 than you do?

9 A. Well, there would be much more to it
10 than that, but I mean that's a possibility.

11 Q. So you can't agree with that
12 statement then, you have to qualify it?

13 A. I would have to qualify it. Depends
14 what they've studied and what the questions were that
15 they were asked to address.

16 Q. Generally speaking - that's a term
17 that you like to use - would you agree that that's an
18 accurate statement?

19 A. Generally speaking, yes, that would
20 be a reasonable statement.

21 Q. Have you ever been involved in
22 teaching and research primarily in the areas of
23 silviculture and forest soils?

24 A. Well, I do teach in the ecological
25 classes in the area of forest soils, but in terms of

1 silviculture, no.

2 Q. Have you done any studies in the
3 area -- you have answered that too. Have you ever
4 visited and studied forestry practices in Europe, the
5 United States, or other provinces of Canada?

6 A. I have studied -- well, I haven't
7 studied them, I have visited and been taken around to
8 see forest practices in Sweden, and I have been on
9 visits to Germany and the to the UK where we've had
10 visits to various kinds of forest activities.

11 Q. But it wasn't as part of a study?

12 A. No, I haven't made a special study of
13 that, no.

14 Q. Do you know what the Ontario Forestry
15 Council is?

16 A. No, I don't think so.

17 Q. So I guess you have never had any
18 formal involvement with that body; fair assumption?

19 A. I might have a bad memory, but I'm
20 quite sure I have not had any involvement with that
21 body.

22 Q. Are you the author of any text on
23 forest soils which is either in use or has been used in
24 the past by any university in North America?

25 A. No.

1 Q. Let's turn to -- I have one question
2 I want to ask you before we get into area of full-tree
3 and tree-length. During the direct examination, Dr.
4 Hutchinson, you were referred to a passage in the
5 transcript of Professor Armson's evidence and in that
6 direct examination you suggested that Professor Armson
7 was indicating that decisions can be made regarding
8 forest trees without being concerned with mycorrhiza
9 and roots; do you recall that?

10 MS. SWENARCHUK: Madam Chair, might I ask
11 that he be referred to the specific passage and be
12 permitted to read it again, because the --

13 MR. FREIDIN: I don't have the specific
14 reference in the transcript. Do you require --

15 MADAM CHAIR: Is that Volume 76, Mr.
16 Freidin?

17 MR. FREIDIN: Well, no. Volume 76 is
18 the -- Volume 74 is the section that he was referred to
19 by Ms. Swenarchuk, and perhaps you could take a look at
20 that.

21 THE WITNESS: Okay.

22 MR. FREIDIN: Q. And that might refresh
23 your memory and then if you need the transcript of your
24 direct evidence, I will leave the question and we will
25 come back to it later.

1 A. Okay.

2 Q. Let's see if we can do it without it.

3 MS. SWENARCHUK: Do you have the Volume
4 74 reference, Mr. Freidin?

5 MR. FREIDIN: Yes. Volume 74, page
6 12563.

7 THE WITNESS: Okay.

8 MR. FREIDIN: Q. Now, do you recall the
9 evidence that you gave regarding Professors Armson's
10 evidence on mycorrhiza?

11 A. I recall a discussion about it, yes.
12 I don't recall exactly what I said.

13 Q. Do you recall whether -- I'm sorry.

14 A. I'm sorry. I don't recall exactly
15 what I said.

16 Q. All right. Well, let me see if --

17 A. I think that's important.

18 Q. Okay. Do you recall suggesting in
19 your evidence that Professor Armson's evidence
20 indicated that decisions can be made regarding forest
21 trees without being concerned with mycorrhiza and
22 roots?

23 A. I can remember the discussion.

24 MS. SWENARCHUK: Perhaps you could refer
25 him to the section, Mr. Freidin.

1 MR. FREIDIN: Q. All right.

2 A. Okay, I'll just read this here.

3 Q. Would you read the section, read
4 12563, line 17, would you take a moment and read that
5 over to page 12565, line 15.

6 A. I think the point that I was making
7 was that mycorrhizal relationships in the forest are
8 very important. Now, I don't know if Dr. Armson had
9 suggested they weren't or not, but...

10 Q. That's why I'm asking the questions.
11 I got the impression in your evidence that you were
12 suggesting that Professor Armson was saying that they
13 weren't important.

14 A. Okay. Well, I do think I have a
15 disagreement here on page 12564 in which Dr. Armson
16 said that --

17 Q. Which line are we looking at?

18 A. This is about lines 6 to 9. I seem
19 to remember that I mentioned some studies at Sault Ste.
20 Marie were looking at the mycorrhizal infections of
21 black spruce and it turns out jack pine too to see if
22 preinnoculating those seedlings before you planted them
23 out in the field had a positive benefit, and there's
24 evidence that it does.

25 So I would disagree with this statement

1 here, there's no evidence that it does in our
2 conditions. I think there now is evidence that it does
3 in those conditions.

4 Q. You're saying that those studies
5 indicate that inoculating them with mycorrhiza makes a
6 difference as to how they perform in the field?

7 A. Yes.

8 Q. And do you believe that's a basis for
9 saying that there's a problem in our forests with
10 mycorrhiza, an absence of mycorrhiza?

11 A. No, I don't think those two would be
12 led directly.

13 Q. The fact that a seedling might do
14 better with mycorrhiza might mean just that, but it
15 doesn't mean that if you plant it without mycorrhiza it
16 will do poorly; does it?

17 A. Well, poorly would be defined as less
18 well. I mean, the experiments indicate that when you
19 plant them and they have preinoculated with mycorrhiza
20 you've got an enhanced plant performance.

21 Q. All right. So if you're
22 interested --

23 A. And there's an indication if you
24 don't, then they're doing less well.

25 Q. If you're interested in enhancing

1 productivity--

2 A. Right.

3 Q. --the results you have indicated, you
4 referred to, might indicate you could enhance it, but
5 it doesn't saying anything about whether it's necessary
6 to inoculate them to maintain productivity, what the
7 natural forest would provide?

8 A. That's right. Are we talking in the
9 context of clearcutting here, or regeneration after
10 fire or what?

11 Q. Well, I'm just talking generally.

12 A. Generally, all right.

13 Q. And do you know -- did the studies
14 compare the results of what would happen if you
15 inoculated these seedlings with mycorrhiza on the one
16 hand, to what would in fact would happen if you just
17 planted regular planting stock?

18 A. My understanding is that these
19 seedlings were inoculated with -- they tested a range
20 of different fungal inoculii, let's call them a
21 different species, and then they tried to sort out
22 which pairing might give you the best benefit when you
23 planted this stock out into the forest, and they found
24 both the jack pine and black spruce that with certain
25 pairings you got a significant enhancement in

1 performance, if I remember rightly but, you know, don't
2 come back on me on this. I think the enhancement --

3 Q. Well, I want you to be accurate
4 because if you aren't I might come back on you.

5 A. All right, I will say nothing, except
6 there was a significant enhancement.

7 Q. But could you answer my question.
8 Did they compare the effect of out planting with
9 mycorrhiza infected seedlings and seedlings grown in
10 the normal way?

11 A. Which were not infected?

12 Q. Which were not infected.

13 A. Yes, I think they did.

14 Q. You think they did?

15 A. I think they did, yes.

16 Q. It would be important to know whether
17 they did or they didn't if what you were interested in
18 was seeing -- comparing obviously whether it was an
19 improvement over natural -- normally grown stock;
20 wouldn't it, you would want to make that --

21 A. Oh, it would be important to find
22 that out, yes.

23 MR. MARTEL: Can I ask a question then.
24 Since I didn't read any of these documents, nor did my
25 research staff dig them out, if you planted regularly

1 and if you enhance by inoculation -- obviously, well
2 it appears we're going to get two different results.

3 On the one hand if you enhance it by
4 inoculation it is better than previously, but what you
5 planted ordinarily, if that was the case under ordinary
6 circumstances, would it be as good as one would
7 anticipate; it might not be the same level as the
8 enhanced one, but it would be what we generally have up
9 to this date in time; is that correct?

10 THE WITNESS: Yes, that would be right.

11 MR. MARTEL: Okay. That's all I wanted
12 to know. Thank you.

13 MR. FREIDIN: Q. Do you know whether
14 nursery grown, like regular planting stock is infected
15 with mycorrhiza, not -- just because of the way they're
16 grown in the nurseries?

17 A. Well, they're grown with nutrients
18 additions generally and that tends to reduce their
19 mycorrhizal infections. Mycorrhiza kind of get
20 together with the roots when the nutrient conditions
21 are poor.

22 Q. Would you answer the question.

23 MS. SWENARCHUK: Excuse me, he is
24 answering the question.

25 THE WITNESS: I thought I was answering

1 the question.

2 MS. SWENARCHUK: In fairness, he's
3 answering the question and he's explaining his answer.

4 MR. FREIDIN: Q. Well, could you start
5 off by telling me whether in fact regular planting
6 stock which leaves the nurseries do or do not have
7 mycorrhiza infection?

8 A. I think quite a bit of it would have.

9 Q. Thank you.

10 A. But, you know, you would need to
11 assess your stock from batch to batch, it would depend
12 on the condition.

13 I think the purpose of some of this
14 research that was going on at Soo is that there has
15 been problems with replanting black spruce and they
16 wanted to know if they could improve the replant
17 performance by infecting with mycorrhizae and, if so,
18 which mycorrhiza.

19 Q. Let's move on to full-tree
20 harvesting.

21 A. All right.

22 Q. And tree-length. Now, in your
23 evidence, Dr. Hutchinson, you indicated that if you
24 full-tree harvest you will lose your biomass, you then
25 side if you lose your slash you remove your forest

1 floor mat, and I took it from that that you equate the
2 term slash and forest floor mat; is that correct?

3 A. No, no, I don't.

4 Q. Okay. What is the difference in the
5 way you use those terms? What is the forest floor mat
6 as opposed to slash?

7 A. Well, slash would be material which
8 is left behind when you remove trees from site, and in
9 conventional harvesting that would be a substantial
10 proportion of all of the foliage, the branches and
11 twigs and so on and maybe the bark too, and that would
12 eventually be incorporated into the forest floor or the
13 forest floor mat, but it would take the process of
14 breakdown and decomposition, so at some stage in the
15 future it merges into the floor mat.

16 Q. So what did you mean then when you
17 lose, if you lose your slash you remove your forest
18 floor mat; what do you mean?

19 A. Well, if you remove your slash you
20 remove that component which will be incorporated into
21 the forest floor.

22 Q. So what you meant was, you lose a
23 possible contribution to your forest floor mat?

24 A. Right.

25 Q. All right. Can you turn to the study

1 referred to on page 5 of your witness statement,
2 Exhibit 1405, the Hubbard Brook study. Perhaps while
3 you do that you could also open your witness statement
4 at page 5.

5 MS. SWENARCHUK: Madam Chair, that would
6 be in source book for witness statement No. 1
7 alphabetized under the title Likens.

8 MR. FREIDIN: Thank you.

9 THE WITNESS: Again, to save time --

10 MADAM CHAIR: What's the exhibit number
11 on that?

12 MS. SWENARCHUK: It's 1405A -- what is
13 the source book or exhibit number?

14 MADAM CHAIR: This is the same one we're
15 working with, 1405A.

16 MS. SWENARCHUK: Yes, Madam Chair.

17 MADAM CHAIR: And it's alphabetized under
18 Likens?

19 MS. SWENARCHUK: Likens, L-i-k-e-n-s.

20 MADAM CHAIR: Thank you.

21 MR. FREIDIN: Q. When you have that, Dr.
22 Hutchinson.

23 A. Yes. Yes, I've got it. I did have
24 it, yes.

25 Q. All right. Well then, as soon as you

1 have it.

2 A. I'm all ears, I'm ready to answer
3 your question.

4 Q. You want to stand up, okay. I will
5 wait till you settle down.

6 A. Okay. I will see if I need this.

7 MS. SWENARCHUK: Madam Chair, if Mr.
8 Freidin has no objection, perhaps we could help Dr.
9 Hutchinson at the lunch break alphabetize all the
10 articles again so he has them available.

11 MADAM CHAIR: Is that all right with you,
12 Mr. Freidin?

13 MR. FREIDIN: Sure. Anything that will
14 speed it along, I think we all want.

15 MR. MARTEL: The speed of an anaemic
16 snail.

17 MR. FREIDIN: Q. Now, this Likens study,
18 would you agree with me -- well, first of all, you talk
19 in this study about leaching results and measurements
20 of nutrients found in streams; is that correct?

21 A. Yes.

22 Q. And can we agree that this was a
23 hardwood forest in New Hampshire?

24 A. Yes, mixed hardwood.

25 Q. Mixed hardwood.

1 A. Mm-hmm.

2 Q. Described in the article as a
3 northern hardwood forest?

4 A. Yes.

5 Q. Do you agree that it was not a study
6 of the effects of timber management activities?

7 A. No, no.

8 Q. You don't?

9 A. I mean, I agree it wasn't.

10 Q. Well -- it wasn't. Let's find out
11 the extent to which it wasn't.

12 A. Okay.

13 Q. First of all, would you agree that
14 this was a hydrological study to see what would occur
15 if an area was deforested?

16 A. Well, they wanted to know what would
17 happen to the nutrient budgets in a watershed if you
18 deforested it, yes.

19 Q. And by deforested, deforested we mean
20 removal of all vegetation on it and maintenance of that
21 condition; i.e., no vegetation through intervention?

22 A. Mm-hmm. Well, they left vegetation
23 on site.

24 Q. They left the slash on the site?

25 A. Yes.

1 Q. But they did everything else
2 possible; did they not, to make sure that there was
3 absolutely nothing else left on the site other than the
4 slash?

5 A. Well, they tried to control
6 revegetation on the site by applying herbicides.

7 Q. That's right. Now, let's -- would
8 you turn to page 43. Do you have that?

9 A. Yes.

10 Q. All right. What I want to do, I want
11 to go through these passages and I want to make sure
12 that I and everyone else has a clear understanding of
13 exactly how similar or dissimilar this experiment was
14 from normal timber management activities.

15 Under the heading General Discussion and
16 Significance, would you go down about five lines or six
17 lines where it is says, 'the deforestation experiment'.

18 A. Right, yes.

19 Q. It says:

20 "The deforestation experiment was
21 designed to test the effects of blockage
22 on a major ecosystem pathway; that is,
23 nutrient and water uptake by vegetation
24 on other components of intrasystem cycle
25 and on the export behaviour of the system

1 as a whole."

2 A. Right.

3 Q. "The block was imposed cutting all of
4 the forest vegetation and subsequently
5 preventing regrowth with herbicides. We
6 hoped this experimental procedure would
7 provide information about the nature of
8 the holiostatic capacity of the
9 ecosystem."

10 A. Yes.

11 Q. "The deforested condition has been
12 maintained since January the 1st, 1966."
13 Just based on that, it is my

14 understanding, Dr. Hutchinson, that they were looking
15 to see cause/effect relationships about what would
16 happen if you actually blocked a major ecosystem
17 pathway, and that was nutrient and water uptake by
18 vegetation.

19 A. Right.

20 Q. And because they wanted to do that,
21 they applied herbicides and controlled that vegetation
22 in ways which are uncommon to normal timber management
23 practices because -- is that right?

24 A. Yes, that's right.

25 Q. Well then, if we go to page 5 of your

1 witness statement, where you're discussing this
2 article, and you say, going down 9 lines:

3 "Herbicides were sprayed on to prevent
4 regrowth of hardwoods as in northern
5 Ontario practice."

6 Can we agree -- when I read that, I
7 assumed that you were saying that the herbicides were
8 applied in the same manner and for the same purposes as
9 they are in northern Ontario practice. Was that the
10 right interpretation of that sentence?

11 A. No.

12 Q. Would you agree that it is a possible
13 interpretation of that sentence?

14 A. That the manner and application and
15 types of herbicides would be similar or the same as a
16 northern Ontario practice? Yes, that's a possible
17 interpretation, yes.

18 Q. But if we're trying to study and know
19 what the effects of timber management are or the use of
20 herbicides in timber management on this issue, would
21 you agree that one would want to be very clear that
22 you're talking about a non-timber management use of
23 herbicides in this study?

24 A. Well, it's an unusual way they
25 have -- it's an unusual use of herbicides, yes. It was

1 simply meant to imply that herbicides are used in
2 northern Ontario.

3 Q. All right.

4 A. In forest management practices.

5 Q. All right. So we should not
6 interpret that as indicating that herbicides were used
7 in the Likens study in the same way in terms of the
8 amount, the frequency, the magnitude, et cetera, of
9 herbicides as is done in practice in the boreal forest
10 in Ontario; correct?

11 A. Completely true.

12 Q. And, therefore, the conclusions in
13 terms of the magnitude of the nutrients which were
14 measured--

15 A. Right.

16 Q. --cannot be used for comparison
17 purposes to what happens in the boreal setting as a
18 result of timber management activities; would you agree
19 with that?

20 A. The conclusions in absolute terms
21 certainly cannot be used in that way.

22 Q. And by absolute terms we're talking
23 about the actual measurements that were made as to the
24 amount of nutrients that they measured in the streams?

25 A. Right.

1 Q. Okay. If you're turn to the Sopper
2 article -- and, Ms. Swenarchuk, if you could help me
3 with which book that's in?

4 MS. SWENARCHUK: Same grouping of
5 articles, Madam Chair, alphabetized under S-o-p-p-e-r,
6 Sopper.

7 MADAM CHAIR: Thank you.

8 MR. FREIDIN: All the articles that I
9 will be referring to will be in source book 1 until I
10 get into the area of fire.

11 Q. Do you have that, Dr. Hutchinson?

12 A. Yes, I do. Thank you.

13 Q. And if you go down to the second
14 paragraph, Sopper sort of outlines what this paper is
15 all about, and he says:

16 "Small gauged forested watersheds have
17 been used for decades to study the
18 effects of forest management practices on
19 water quantity. Within recent years more
20 emphasis has been placed on determining
21 the effects of these practices on water
22 quality, a considerable fund of
23 information is beginning to accumulate."
24 He says:

25 "Rather than attempt to summarize all of

1 these studies, the results of a few
2 selected studies are presented to provide
3 a panorama of the types of water quality
4 investigations currently underway on
5 forested watersheds throughout the United
6 States."

7 Now, if you turn the page to page 25, in
8 the second paragraph Sopper says:

9 "An extreme example..."

10 A. Mm-hmm.

11 Q. "The forest clearcutting study of
12 Hubbard Brook, New Hampshire. This
13 experiment was quite unlike a normal
14 timber harvest clearcutting because the
15 area was sprayed with herbicides for
16 three successive summers to prevent
17 regrowth."

18 Would you agree with Sopper's
19 characterization of the Hubbard Brook experiment as an
20 extreme example?

21 A. The results on the experimental setup
22 up were certainly more extreme than many of the others,
23 yes.

24 Q. Would you agree that it was an
25 extreme example; at one extreme, if you were trying to

1 have things on a scale of comparison to timber
2 management.

3 A. Right. It would be rather like the
4 large fires that occur, it would be an extreme event.

5 Q. We will get to the extreme fires
6 later. Would you turn to page 27 of the article.
7 That's in your source book. Do you have that?

8 A. Page 27.

9 Q. 27 of this article.

10 A. Yes.

11 Q. Would you go to the bottom of the
12 left-hand column. It says:

13 "In general it appears that nutrient
14 losses following forest clearcutting are
15 small to negligible, except for the
16 drastic Hubbard Brook watershed
17 clearcutting experiments in New Hampshire
18 which utilized herbicides to maintain the
19 watershed in a devegetated condition.
20 Nitrogen losses in streamflow following
21 clearcutting have not reduced water
22 quality below drinking water standards."

23 It goes on and he refers to the Hubbard
24 Brook watershed as being atypical of the other results.
25 Would you agree with the comments made by Sopper that

1 I've just referred you to?

2 A. Not the first part. I would agree
3 that clearcutting hasn't reduced water quality to below
4 drinking water standards, but I think he's also taking
5 a rather extreme position when he suggests that
6 nutrient losses follow clearcutting are small to
7 negligible.

8 Likens, Bormann and Pierce have repeated
9 those experiments in Hubbard Brook where they used
10 commercial clearcutting practices with the United
11 States Forest Service and their results certainly were
12 less extreme than the first example that they
13 published, which was this rather unusual method of
14 cutting and site maintenance with herbicides.

15 But certainly their subsequent work has
16 borne out the general direction of nutrient losses from
17 site and quantified it, and there's many, many other
18 studies which have done exactly the same thing.

19 Q. All right. Well then, let's --

20 A. I think Sopper's taken, you know,
21 he's sort of swung the pendulum the other way from that
22 statement.

23 Q. Okay. Other than that comment, that
24 general comment, we can agree then that that particular
25 Likens study was in fact drastic and was at the extreme

1 end of the scale?

2 A. That first Likens study was, the
3 subsequent ones were not.

4 Q. Well then, let's look at one of the
5 other Martin and Likens studies that you just referred
6 to, in the same source book let's turn to the study of
7 Martin and Pierce, I will see if I can give you the
8 other authors, Martin, Pierce, Likens and Bormann.

9 A. Can you just tell me the page in my
10 witness statement. Could you tell me the page in the
11 witness statement?

12 Q. Oh, the page in the witness statement
13 that you find that on will be page 22.

14 A. Thanks.

15 Q. Do you have that article?

16 A. Yes.

17 Q. And is this the article or one of the
18 articles that you indicated in your earlier response
19 had been done by these same group of scientists in the
20 Hubbard Brook experimental area?

21 A. Right, yes.

22 Q. And I believe Mr. Cassidy spent some
23 time with you on this, but we agree that they examined
24 numerous clearcutting commercial operations where the
25 tree-length method was used?

1 A. Yes.

2 Q. Can we go over to page 23 of your --
3 well, look at your witness statement, page 22.

4 A. Right, okay.

5 Q. Now, this is where you refer to the
6 article that we're looking at, and you say, starting at
7 the very last line:

8 "Overall and in every case, commercial
9 clearcutting of northern hardwood forests
10 in New Hampshire caused accelerate loss
11 of dissolved nutrients to streams. The
12 losses and patterns were similar to those
13 they reported earlier from their own
14 experimental clearcut at Hubbard Brook."

15 Now, I want to just -- to clarify, you
16 say that the losses of patterns were similar. Would
17 you agree that they were similar in the sense that
18 there was an increase in nutrient additions to streams
19 after harvest with a general decline over four years?

20 A. Yes.

21 Q. That's what the study found?

22 A. Yes, that's what I mean by patterns
23 too, that the nutrients which showed an accelerated
24 loss were the same nutrients which they found in their
25 initial stages showed that loss, but in the subsequent

1 studies and in this one the losses were less.

2 Q. All right. So that this quote, where
3 it says:

4 "The losses and patterns were
5 similar...", then should not be
6 interpreted as indicating that they were similar in
7 absolute numbers or the amount of nutrients addition --
8 pardon me, the amount of nutrients added, they were
9 only similar in that the pattern of an increase and a
10 decrease after four year was similar?

11 A. Well, if you just bear with me a
12 moment I will just read what I wrote about it. I don't
13 think that anybody would interpret it as meaning that
14 the quantities were the same as in the first studies of
15 theirs. It doesn't seem to me that it's written that
16 way.

17 It's indicating that the patterns; that
18 is, an increased nutrient loss following clearcutting
19 was repeated in these studies and that the nutrients in
20 particular which were lost were the same; that is,
21 nitrate, calcium, magnesium, sodium chloride.

22 Q. Yes, but see I was concerned about
23 that, Dr. Hutchinson, because when I read it, it said
24 the losses and the patterns, so I read it the losses
25 were similar to those, the patterns were similar.

1 A. Okay. Well, it isn't meant to imply
2 that.

3 Q. It wasn't meant to imply that?

4 A. It wasn't meant to imply that the
5 quantities which were lost were similar, definitely
6 not. The point in putting it in actually was that they
7 did a subsequent study and found the same sort of
8 patterns.

9 Q. The same patterns in that certain
10 nutrients showed an elevated level over a period of
11 time.

12 A. That's right.

13 Q. As they did in the experiment back in
14 the early 70s?

15 A. And that over about a four-year
16 period water quality in terms of concentrations
17 returned to pre-cut levels.

18 Q. But in no cases in terms of drinking
19 water quality, in no situation did it ever contravene
20 the drinking water quality standards; is that correct?

21 A. No, I haven't come across a study
22 that's found that we have contravened drinking water
23 standards by clearcutting. The point is that there's
24 an increased rate of water loss from the site and the
25 concentrations may be below drinking water standards,

1 but there's a volume concentration effect which gives
2 you the overall loss per se.

3 Q. Right.

4 A. So if you worry about your
5 terrestrial system, there's a loss occurring; if you
6 worry about drinking water standards, you don't
7 contravene them.

8 Q. All right. And well get to the other
9 issue later.

10 A. Okay.

11 Q. Okay. While we are on this article,
12 this article also deals with acidity of streams--

13 A. Mm-hmm.

14 Q. --as well; does it not?

15 A. Yes, I believe it does. Yes.

16 Q. And can we agree that the report
17 concludes that the acidity of streams fell below
18 reference streams in the second year after
19 clearcutting? I can refer you to the abstract.

20 A. Yes, thank you, if you would. I'm
21 just trying to find it.

22 Q. Refer you to the abstract about three
23 quarters of the way down.

24 A. Yes.

25 Q. And I'm asking you these questions

1 because I'm saying, let's assume that someone was
2 interested in knowing how long any one of these effects
3 might last.

4 A. Mm-hmm.

5 Q. Assuming that that's an important
6 consideration.

7 A. Right.

8 Q. Do you agree that the study results
9 indicated that during the first year after cutting,
10 streams from the cuts were more acidic than those from
11 the reference streams, however, they were less acidic
12 by the end of the second year. Do you agree that that
13 was a conclusion?

14 A. Yes, yes.

15 Q. And that was less acidic than it was
16 prior to the --

17 A. Prior to the clearcutting, yes.

18 Q. Now, you dealt with I believe acidity
19 in streams during your evidence; did you not?

20 A. Yes, I referred to it.

21 Q. Is there any particular reason you
22 didn't site the results of this study?

23 A. I don't think there's any particular
24 reason, no. It could have been cited to indicate that
25 following clearcutting acidity increased in the first

1 year, but it was short lived.

2 Q. Do you agree, sir, that when one is
3 considering effects of any anthropogenic stress on the
4 environment, that the duration of the effect can in
5 many cases be an important consideration?

6 A. Yes. Not necessarily the most
7 important one, but duration is important.

8 Q. Yes. Magnitude is important?

9 A. Yes.

10 Q. Frequency of the effect is important?

11 A. It may well be, yes.

12 Q. Intensity of the effect, I mean
13 the --

14 A. That would be like magnitude to me
15 but, yes. From the point of view of the biota and the
16 aquatic systems, both of those things; that is,
17 magnitude, that is how much of a deviation from normal
18 occurs in terms of acidity, that's very important
19 because a flush of acidity can actually eliminate the
20 organisms which are living in a waterbody, and then if
21 you've got a receiving lake, it's a question of how
22 much you're putting in over time into that lake that is
23 probably the important factor.

24 Q. So I think we agree that duration can
25 be a very important --

1 A. Total agreement, yes.

2 Q. Again, I'm a little bit out of order,
3 but let's deal with this article. Turn to page 23
4 which you may already been on in your witness
5 statement. You see that you have quoted from this
6 study in the middle of the page which says:

7 "Removal of the canopy..."

8 Do you see that?

9 A. Yes.

10 Q. Now, after the quote you state that:
11 "Nutrient concentrations in streams
12 draining clearcuts decreased distinctly
13 proportionately as the size of the
14 watershed cut becomes smaller."

15 A. Right.

16 Q. I'm not very good on math, Dr.
17 Hutchinson. What do you mean that this occurs
18 proportionately?

19 A. Well, if you cut 10 per cent of a
20 watershed that would have a less profound effect on
21 water quality and receiving streams and lakes than if
22 you cut 50 per cent.

23 Q. Mm-hmm.

24 A. And maybe it's proportional.

25 Q. Well, this says it's proportionately.

1 A. Yes.

2 Q. All right. Would you turn to page 10
3 of the study please, of the Martin, Pierce, Likens and
4 Bormann study? Was it your practice, Dr. Hutchinson,
5 when you wrote this paper -- or this witness statement,
6 to indent when you were quoting and not indent when you
7 were not?

8 A. I would think so, yes.

9 Q. Okay. Would you look at the top of
10 page 10 on the right-hand column.

11 A. Right.

12 Q. I suggest to you that the first
13 sentence -- pardon me, the first two sentences there--

14 A. Right.

15 Q. --has been reproduced word for word--

16 A. Yes.

17 Q. --in the paragraph on page 23 of the
18 witness statement.

19 A. Right.

20 Q. Except one change has been made.

21 A. One change, okay.

22 Q. In your witness statement you have
23 changed the word -- you have changed it so that it no
24 longer says 'nutrient concentrations in streams during
25 clearcuts decreased distinctly as the proportion of the

1 watershed becomes smaller', you have introduced the
2 concept of proportionately. Would you agree with me?

3 A. It's the same thing but, yes, that
4 seems to be a word change.

5 Q. It is the same thing?

6 A. Proportion and proportionately
7 certainly comes from the same root.

8 Q. It comes from the same root, Dr.
9 Hutchinson, but I can -- my review of this article
10 indicates that they looked at different size clearcuts.

11 A. Yes.

12 Q. And there was no question that as a
13 clearcut became larger it had an effect on the streams
14 draining, but the purpose of the study -- and there was
15 no conclusion in the study that said that there was a
16 proportional relationship between the two. I want to
17 know --

18 A. I think there's a subtlety here
19 that's escaping me. That obviously is supposed to
20 be -- that's supposed to be the continued quote, so
21 you're quite right, that should have been indented.

22 Q. But if it was supposed to be the
23 continued quote, Dr. Hutchinson--

24 A. Right.

25 Q. --the words wouldn't have been

1 changed. Has it come out of quotes because you've
2 changed the word to introduce a different concept than
3 the authors?

4 A. No, I don't think so.

5 Q. So then there has been two errors
6 made here.

7 A. Mm-hmm.

8 Q. The paragraph has not been put in
9 quotes.

10 A. Right, that's certainly evident.

11 Q. And the words have been changed.

12 A. Yeah. I hand wrote these things and
13 then they were typed and, you know, I put little
14 hyphens there for in quotes, and maybe -- my writing is
15 pretty terrible and I think that was missed.

16 So I apologize to everybody for this, not
17 having put that in quotes. It clearly is from the same
18 source out on that page. So I think it's very obvious
19 that that was supposed to be in quotes.

20 Q. Then would you agree --

21 A. And proportionately I can't -- I'm
22 not following the subtleties of why you think there's a
23 change in meaning, I think it means the same thing.

24 Q. Well, it's just my understanding, Dr.
25 Hutchinson, that if you have a clearcut of 10 and you

1 increase that to 30 --

2 MS. SWENARCHUK: Ten what, excuse me, Mr.
3 Freidin?

4 MR. FREIDIN: Q. Ten hectares, ten per
5 cent of the watershed and you change it to 30 per cent
6 of the watershed, if there was a relationship -- if the
7 proportion -- if the streams draining the clearcuts
8 decreased proportionately as the size of the watershed
9 gets cut, you would expect a 200 per cent increase as a
10 result of cutting 30 per cent of the watershed as
11 opposed to 10 per cent; right?

12 A. No, you would expect a 300 per cent
13 increase, if that was true, but, no, you wouldn't
14 expect that. It's relative to the amount that's left.
15 So your changing your ratios of uncut to cut.

16 Q. Well, let's -- I don't care which way
17 you do it, it's the amount of cut. So in my example
18 then you leave 70 per cent.

19 A. Yes.

20 Q. All right. And we're talking about
21 how much water leaves the clearcut.

22 A. Right.

23 Q. Now, if there is a relationship as
24 stated in the witness statement that it's proportional.

25 A. Mm-hmm.

1 Q. If instead of cutting 30 per cent you
2 cut 50 per cent, how much increase would you expect in
3 the water which left compared to the 10, the 30 and the
4 50?

5 A. You would really have to work that
6 out, because it means there's less left uncut and you
7 have increased -- it's a proportional increase.

8 Q. It's a proportional increase. So
9 again, as I understand the word proportional--

10 A. Yes.

11 Q. --proportionally, what that says to
12 me is that if you cut 10 -- pardon me, if you leave --
13 Can we do it the other way around. If you cut 10 per
14 cent of the watershed, which means you leave 90.

15 A. Right, okay.

16 Q. You get a certain amount of water
17 runoff.

18 A. Yes.

19 Q. If you cut 30 per cent--

20 A. Yes.

21 Q. --you would expect, if it's
22 proportionate relationship, you would expect 200 times
23 more to come off?

24 A. Yes.

25 Q. If you did it, 50 hectares, you would

1 expect how much more? Instead of 10 hectares you've
2 got 50 hectares, using a proportional relationship, how
3 much more?

4 A. Five times as much.

5 Q. Five times as much.

6 A. Yes, to come off that part but now
7 you've got less of the --

8 Q. But I suggest to you that that is
9 different than the situation where you might increase
10 it from 10 to 30 and not get 200 per cent, you might
11 get only a five per cent increase, you might increase
12 it from 30 to 50 and only get a 12 per cent increase.

13 A. Right.

14 Q. And that would not be accurately
15 described as:

16 "Nutrient concentrations in streams
17 draining clearcuts decreased distinctly
18 and proportionately."

19 It would be what the authors say, as
20 proportions get larger the water runoff is greater, but
21 they don't put any sort of numbers on it and say it's
22 going to be a proportionate relationship and I'm just
23 trying to see whether you agree with that.

24 A. Well, I do agree with that. I do
25 agree with that.

1 Q. But if you agree with that -- please.
2 If you agree with that, then the words have been
3 changed and, therefore, the meaning has been changed in
4 your witness statement.

5 A. No. In both cases I take
6 proportional and proportionate to basically mean the
7 same thing. What you're trying to demonstrate is that
8 there's a linear relationship between clearcut size and
9 runoff, a linear proportion.

10 This doesn't define what sort of
11 proportionate relationship there is. So you're going
12 beyond the words and assuming that it's meant linear,
13 and I certainly haven't made that assumption.

14 Q. All right. Well just let the
15 words -- thank you for your clarification.

16 A. And certainly I don't think it's just
17 a -- I don't know how proportionate is there actually.
18 I guess I'm not terribly good even at copying and my
19 writing is terrible, I can't believe she couldn't
20 read --

21 Q. Did you proof read this report before
22 it was handed into the Board?

23 A. I thought I did, yes.

24 Q. You thought you did, or you did?

25 A. I did, yes, I did, but obviously not

1 successfully totally.

2 Q. All right. You missed this one. All
3 right. Let's go back in your witness statement, we
4 were way back on page 5 I think when we got into this
5 discussion about Hubbard Brook.

6 You indicate on page 5 in the last full
7 paragraph in the middle about, four lines down, you
8 refer to the loss of nitrate:

9 "An element often in limiting supplies
10 for tree growth throughout the boreal and
11 hardwood forests of eastern north
12 America."

13 Do you see that?

14 A. Four lines down?

15 Q. Yes, four lines from the bottom.

16 A. Yes, okay. Right, I've got it.

17 Q. You're talking about the study at
18 Hubbard Brook, they measured certain nutrients in the
19 stream, and it says:

20 "This loss of nitrate, an element often
21 in limiting supplies for tree growth
22 throughout the boreal and hardwood
23 forests of eastern North America."

24 I want to ask you some questions about
25 that, if I might. Can nitrogen in the soil take

1 different forms, Dr. Hutchinson?

2 A. Yes.

3 Q. Could you tell me the different
4 forms. Just name the different forms for me?

5 A. Well, there would be inorganic and
6 organic forms. Nitrate, ammonium, and then you would
7 have things like amino acids and proteins, you would
8 have some nitrogen forms which are complex with the
9 organic matter.

10 Q. Okay. And you mentioned ammonium.

11 A. You might have some nitrite but
12 that's very transient.

13 Q. You find it in the ammonia form as
14 well as the ammonium form?

15 A. Ammonia. No, you find in the soils
16 ammonium, that's NH_4 form.

17 Q. Okay, thank you.

18 A. Ammonia is NH_3 and that's a gas which
19 would come up maybe from the soils.

20 Q. Is nitrogen in the nitrate form
21 present in boreal forest soils?

22 A. Is nitrate present in boreal forest
23 soils?

24 Q. Yes.

25 A. In the inorganic form?

1 Q. Yes, in the inorganic form?

2 A. Yes, yes.

3 Q. Is nitrogen in the nitrate form
4 present in the balance -- pardon me, in the soils in
5 the balance of the area of the undertaking?

6 A. I'm sorry, could you repeat that.

7 Q. Is nitrogen in the nitrate form
8 present in the forest soils in the balance of the area
9 of the undertaking, the Great Lakes/St. Lawrence
10 Forest?

11 A. You get nitrate in all of the soils.
12 Most of the nitrogen is bound to organic matter.

13 Q. Now, how much of the nitrogen in the
14 boreal forest soils is in the nitrate form as opposed
15 to the ammonium form?

16 A. As opposed to ammonium. Well,
17 nitrate gets picked up very rapidly by microorganisms
18 so that they have a tendency to pull it out of the soil
19 as soon as it becomes available as a result of other
20 microbial processes. So you generally have a rather
21 low quantity of nitrate which you can extract from the
22 soil.

23 Q. Okay. So the answer would be that
24 you would find more nitrogen in the ammonium form in
25 the boreal forest soils than you would in the nitrate

1 form?

2 A. Depending on pH that would be a
3 reasonable statement.

4 Q. Is there any difference between the
5 nitrate form and the ammonium form if one is concerned
6 regarding water quality?

7 A. What, for drinking water standards?

8 Q. Yes.

9 A. Well, they have different standards
10 for ammonium and nitrate. The main concern, the main
11 focus tends to be on nitrate.

12 Q. Why?

13 A. Because of some biological
14 interactions.

15 Q. Does it have something to do with
16 toxicity of nitrates?

17 A. At higher levels, yes.

18 Q. In drinking water.

19 A. Yes, that would be one.

20 Q. More of a concern about nitrates --
21 nitrogen in the nitrate form in drinking water than in
22 the ammonium form?

23 A. Well, I don't think I can answer that
24 question, but it's a reasonable supposition. I don't
25 think I know the answer to it.

1 Q. Are there any differences between
2 nitrate form of nitrogen and the ammonium form of
3 nitrogen in terms of uptake by boreal tree species?

4 A. Is there any difference?

5 Q. Yes, is there any difference?

6 A. Yes.

7 Q. What's the difference?

8 A. That most plants take up the nitrogen
9 in the form of nitrate. That is, the availability of
10 nitrate for root uptake is higher than -- at the root
11 surface, the preferred form of nitrogen is nitrate.

12 Q. Which is...

13 A. Now, there are boreal species which
14 have an enhanced ability to take up ammonium, so if you
15 like one of the adaptations of some of the acid
16 tolerant boreal species and acid tolerant ones
17 elsewhere is to take up ammonium.

18 Q. Okay. I think you may have answered
19 this, but I just want to make sure I have it clear. Is
20 nitrate more leachable than nitrogen in the ammonium
21 form?

22 A. The solubility -- you're asking me
23 the solubility of nitrate versus ammonium. I don't
24 think I know the answer to that. Nitrate is certainly
25 very soluble, but I can't give you an exact comparison

1 of ammonium.

2 Q. Could you refer to the Sopper paper
3 which is the one we were at before, it's in Volume 1,
4 Madam Chair.

5 A. I have got it.

6 Q. Sorry, if I could just have a moment
7 here. All right. Do you have page 27?

8 A. Yes.

9 Q. And if you look at the left-hand
10 column, the third sentence starts:

11 "Nitrogen in the water ...", do you see
12 that?

13 A. Yes.

14 Q. It says.

15 "Nitrogen in the water was not measured
16 but the authors indicate that nitrates
17 are probably quite low because the acid
18 soils under the coniferous stands have
19 few nitrifying bacteria and nitrification
20 rates measured on several soil samples in
21 the lab were hardly detectabl."

22 A. Right.

23 Q. Does that make scientific sense to
24 you, or does your expertise allow you to comment on
25 that, Dr. Hutchinson?

1 A. Well, let me just read it again.

2 "Nitrogen in the water was not measured
3 but the authors indicated that nitrites
4 are probably quite low..."

5 So they have made an assumption, the
6 authors of whichever paper this was, that because they
7 were dealing with acid soils under coniferous stands
8 with low nitrifying bacteria there will be low nitrates
9 in the water. Yes, that is a reasonable assumption.

10 Q. Can you tell me why you have focussed
11 on nitrates in your witness statement on page 5,
12 notwithstanding our discussion about the differences
13 between nitrates and ammonium, and the comment by
14 Sopper who indicates that you're not likely to have
15 much nitrate in the acid soils or the coniferous
16 stands.

17 A. Okay. I'm just going to look at my
18 page 5 and see what you feel I have done here. Why I
19 focussed on -- well, I just said that many studies
20 point out that following -- well, cutover watersheds
21 show a substantial loss of nitrogen as nitrate in the
22 first three years after felling.

23 Q. Dr. Hutchinson --

24 A. That doesn't sound like --

25 Q. Assuming that this Board is

1 interested about what happens in the boreal forest of
2 this province.

3 A. Right.

4 Q. Why is it relevant or helpful to talk
5 about losses of nitrates which the literature which you
6 have cited have indicated that it's rare indeed in the
7 acid soils under coniferous stands?

8 A. Well, the Board is surely interested
9 in more than the coniferous forests of the boreal, it's
10 interested in the Great Lakes/St. Lawrence also and
11 there's a lot of hardwood species in there, that would
12 be one answer.

13 Q. But this comment, Dr. Hutchinson,
14 says this loss of nitrate and an element often in
15 limiting supplies for tree growth throughout the
16 boreal.

17 A. Right.

18 Q. And hardwoods. I'm focussing on the
19 boreal. Your comment is equally applicable to both.

20 A. Mm-hmm.

21 Q. Why have you made that comment or
22 that observation in light of the literature that you
23 yourself have cited indicate that this issue of
24 nitrate, if I might suggest to you, Dr. Hutchinson, is
25 a bit of a red herring when we're talking about the

1 boreal forest.

2 A. I don't accept that it's a red
3 herring.

4 Q. All right. Let's leave aside my
5 characterization of it as a red herring. Why have you
6 made a point of talking about nitrates, I mean, in the
7 boreal forest?

8 A. Well, these various studies have
9 indicated that nitrogen is lost from -- off site, we
10 probably agree that nitrate is a very soluble form of
11 nitrogen, and one way of monitoring loss from site in
12 stream water is to measure nitrate. You can also
13 measure ammonia, and many people have measured ammonia
14 too. Indeed the Sopper paper that you pointed me at
15 measures ammonia too, so there's nothing magic about
16 this.

17 Q. You just told me that nitrates are
18 lost off site because they're soluble.

19 A. Yes.

20 Q. I understood your evidence to
21 indicate that nitrogen in the ammonium form is not as
22 soluble; am I correct?

23 A. No, I said I would have to check on
24 that, but my feeling is that it's not. But, you know,
25 I would have to check on solubilities. I did say that.

1 Q. So it might be -- would you agree
2 then that whether or not ammonium is equal to, more or
3 less soluble than nitrate, might be a question that one
4 might ask oneself if one was concerned about losses of
5 nitrogen from the site?

6 A. You would be concerned about either
7 nitrate or ammonium and probably both if you're
8 concerned about nitrogen losses from the site.

9 Q. And one last question before --

10 A. Both are important.

11 Q. Is it your evidence, Dr. Hutchinson,
12 that nitrogen in the nitrate form is in limiting supply
13 for tree growth throughout the boreal forest?

14 A. No, nitrogen is in limiting supply
15 for the boreal forest.

16 Q. Not nitrate as you have stated on
17 page 5 then; is that right?

18 A. Well, let me see. Did I state that
19 on page 5?

20 Q. Yes. Take a look at the sentence we
21 looked at, it says:

22 "this loss of nitrate, an element often
23 in limiting supply for tree growth
24 throughout the boreal..."

25 Are you now telling me that it should

1 read nitrogen and not nitrate?

2 A. No, I'm not telling you that. It
3 should read exactly as it is, but you have to
4 understand that the element is nitrogen and the
5 compound is nitrate.

6 Q. Well, you have called nitrate an
7 element.

8 A. No, I haven't.

9 Q. Yes you did, it says:

10 "This loss of nitrate, an element..."
11 Nitrate's a molecule; isn't it?

12 A. Okay. Well, we really are getting
13 into semantics here.

14 Q. Well, Dr. Hutchinson, I'm going
15 through it with this level of precision because this is
16 supposed to be a scientific paper, we're dealing with
17 scientific issues, and I think it's important to be
18 precise, and is this an indication, another indication
19 of where you have not been precise?

20 A. No, I don't think so. I think that's
21 very apparent to any scientist what's meant there.

22 Q. Any scientist.

23 A. Mm-hmm.

24 Q. Did you explain the difference to the
25 Board in your direct evidence?

1 A. Well, I feel it was probably evident
2 to the Board too.

3 Q. Oh, the Board is supposed to
4 understand all these subtleties that scientists do
5 without you telling them; is that it?

6 A. Some.

7 Q. Thank you. Let's move on to the
8 Timmer and Marek paper which you will find in the same
9 source document.

10 A. Can we go back to that, I really
11 don't think I've satisfied your question.

12 Q. Well, you have satisfied my question,
13 so if you want to tell me something to satisfy me, you
14 don't have to say something.

15 A. I'm now looking at the sentence.

16 "This loss of nitrate...", it's self
17 evident that nitrate is not an element, therefore,
18 nitrogen is the element. I mean, I think that's just
19 an understood in that sentence.

20 Q. Thank you very much. Let's look at
21 Timmer and Marek paper, please.

22 A. Timmer and -- okay.

23 Q. This is the one, Timmer, Savinsky and
24 Marek. Do you have that paper, Dr. Hutchinson?

25 A. Yes, I do.

1 Q. Now, this is the paper where you
2 adopted the recommendations I believe which appear on
3 page 145 which is just before the bibliography; is that
4 right?

5 MR. MARTEL: Can you hang on for one --

6 MADAM CHAIR: We don't have that last
7 paper.

8 MS. SWENARCHUK: That's in MNR's witness
9 statement No. 10, Madam Chair.

10 MADAM CHAIR: Thank you.

11 MR. FREIDIN: You will find it in the
12 witness statement at page 451.

13 MR. HUFF: Found in Exhibit 416A.

14 MR. CASSIDY: Also in the source book.

15 MR. FREIDIN: So it's in both apparently,
16 Madam Chair. You have all got that. Okay.

17 Q. Now, if we turn to page 465 of Panel
18 10, or if you have got the source book, page 145, the
19 bottom right-hand corner, would you agree that this is
20 the paper, the recommendations of which you adopted or
21 endorsed in your direct evidence?

22 A. Yes. This was in my witness
23 statement, I think I quoted these.

24 Q. Almost all the papers I will refer
25 you to were in your witness statement.

1 A. No, I think I actually kind of listed
2 these recommendations, yes.

3 Q. Okay. This paper, by the way, the
4 discussion of this paper starts on page 8 of your
5 witness statement.

6 A. Right.

7 Q. And follows through to the middle of
8 page 11. So if you have need to refer back to your
9 witness statement as we go along, please do so, Dr.
10 Hutchinson.

11 Can we agree, Dr. Hutchinson, that the
12 study that was undertaken in this paper was based on a
13 summer logging operation.

14 A. I will just check. I don't disagree
15 at the moment, I just want to check. It doesn't seem
16 to be the case.

17 "The deep black spruce hardwood and
18 balsam fir..."

19 Q. I'm sorry, where are you referring
20 to?

21 A. I'm sorry, I'm referring to page 134
22 at the bottom, last paragraph.

23 Q. Just give us all a chance to find it.
24 Okay.

25 A. 134, under Harvesting Operations.

1 Okay. I see there it says:

2 "The deep black spruce hardwood and
3 balsam fir sites were harvested in
4 January, February and March." That's not
5 really the summer.

6 Q. I see. It was the next one, I'm
7 sorry, the second site was though.

8 A. That would be the shallow black
9 spruce.

10 Q. Okay. Then let's see if we can just
11 limit our conversation to the shallow soiled black
12 spruce site which was harvested during mid-summer, all
13 right?

14 A. Yes, okay.

15 Q. Can you advise how dense or sparse,
16 if I can use that word, was that site in terms of
17 stocking in comparison to the average black spruce
18 site?

19 A. Average for what?

20 Q. Well, does an average black spruce
21 site, the stocking of an average black spruce site have
22 no meaning for you?

23 A. Yes.

24 Q. And does that meaning include the
25 aspect of stocking?

1 A. Yes, I have some idea of stocking.

2 Q. Right. And so can you compare --

3 A. I'm not an expert in stocking rates.

4 Q. All right.

5 A. But if you want to ask me --

6 Q. All right. So you're not an expert

7 in stocking.

8 A. No.

9 Q. But are you able then, based on
10 whatever expertise you do have on stocking, are you
11 able to compare what you have in your mind as the
12 average stocking versus the stocking of the site which
13 was logged during the mid-summer as reported in this
14 study?

15 A. All right.

16 MS. SWENARCHUK: Madam Chair, if Mr.
17 Freidin is suggesting that there is an average black
18 spruce stocking, perhaps it could help if he could
19 specify in what area or what type of soils he's
20 referring to. It's a difficult concept I think to -

21 MR. FREIDIN: I'm not in the position to
22 give any evidence here, I want to know whether the term
23 density mean anything to this witness and if the
24 witness is saying that he can't answer the question
25 because of my use of the phrase 'average black spruce

1 site', then I'll move on and maybe think of rephrasing
2 the question later on in the day.

3 THE WITNESS: Well, a density -- if you
4 like, the stocking rates for these sites are given in
5 that table, and the shallow site is stocked, it has a
6 stand density of 2,140 trees per hectare.

7 MR. FREIDIN: Q. We're referring to
8 Table 1?

9 A. Table 1 on the same page, yes, page
10 134.

11 Q. And is that a dense stand?

12 A. For shallow sites, hmmm. No, I don't
13 think I can answer that question.

14 Q. Okay. If when one measures the
15 amount of biomass that is taken off of a site--

16 A. Right.

17 Q. --one is measuring on one hand a very
18 dense stand and on the other hand is measuring, you
19 know, a stand which is not dense--

20 A. Right, yes.

21 Q. --you would expect a difference in
22 the measurement of the biomass removed; would you not,
23 if you're measuring the trees, the biomass removed in
24 the trees?

25 A. Well, it's the size of the trees also

1 as well as density, so it's number times volume.

2 Q. All things being equal, same stand,
3 same size trees...

4 A. Well, if all things are equal, then
5 the answer is self evident, yes, of course more dense,
6 but they would rarely be equal given the way trees
7 grow.

8 Q. No, no, I'm saying if you have a
9 stand right here in the middle of the floor and you
10 took that stand and it had a certain density and you
11 removed all the trees.

12 A. Right, yes.

13 Q. And you had the same stand three
14 times as dense, same proportions in terms of the size
15 of trees.

16 A. Okay.

17 Q. The amount of biomass you would
18 remove when you had three times the number of trees
19 would be three times greater?

20 A. Yeah.

21 Q. Okay.

22 MR. FREIDIN: I think on that little note
23 of proportions, Madam Chair, I think it might be a good
24 time for a break.

25 MADAM CHAIR: We will break for lunch now

1 and we will be back at 1:30.

2 ---Luncheon recess taken at 12:00 p.m.

3 ---On resuming at 1:30 p.m.

4 MADAM CHAIR: Good afternoon. Please be
5 seated.

6 Mr. Freidin, we have a little statement
7 we wanted to read into the record and it's ready now,
8 so I might as well do this. Will this interrupt you?

9 MR. FREIDIN: No, it won't

10 MADAM CHAIR: It will just take a minute.

11 We wish to inform the parties today of
12 Mr. Martel's activities on behalf of the International
13 Institute of Concern for Public Health. For many years
14 prior to joining this Board, he had a long-standing
15 interest in occupational health. On leaving Queen's
16 Park he was asked to become a Board Member of the
17 International Institute of Concern for Public Health.
18 This Institute is headed by Dr. Rosalie Bertel, a world
19 recognized authority in certain areas of public health.
20 Dr. Bertel is a nun, holds a doctorate in mathematics
21 and biometrics, and after hearing her speak on the
22 effects of low-level radiation, Mr. Martel agreed to
23 become a member of her Board.

24 Prior to joining the Environmental
25 Assessment Board he advised the Office of the

1 Attorney-General of his background interest in this
2 area and disclosed his membership in the Board of the
3 Directors of the Institute. Since joining the
4 Environmental Assessment Board he has not participated
5 in any Board discussions or hearings that had any
6 connection with subjects or issues involving the
7 Institute.

8 In the summer of 1990 he was asked to
9 assist the Institute in raising funds for its general
10 operations which are supported by donations and modest
11 fees for consultations. His efforts consisted only in
12 writing to the senior executives of several national
13 trade unions to seek their support of the Institute.

14 After he had written letters on behalf
15 the Institute, two local unions affiliated with two of
16 the national trade unions he had earlier written to
17 appeared at a meeting of the Timber Management Hearing
18 Panel to state their positions on behalf of their
19 members in relation to the matters this Panel is
20 dealing with.

21 He has had no other contact or
22 correspondence with these locals. As a result of these
23 appearances by the two locals, and while we are
24 convinced that these events will have no impact on our
25 decisions on the issues in evidence at this hearing, we

1 have decided to advise the parties to these proceedings
2 of this events by placing this statement on the record.

3 MR. FREIDIN: Thank you. Okay?

4 MADAM CHAIR: Yes.

5 MR. FREIDIN: Q. Now, Dr. Hutchinson, we
6 were on the Timmer, Savinsky and Marek paper. I would
7 ask you to have that paper open at page 134 - if you're
8 looking at the Panel 9 witness statement it's at page
9 454 - and also would you take out the Foster and
10 Morrison, 1987 article which you'll find in Panel No.
11 9, that is Exhibit 414, and I would ask that you turn
12 to page 77 of that document.

13 A. All right.

14 Q. So have you got those two?

15 A. Yes.

16 Q. Just make sure. So it's page 77 of
17 Panel 9 witness statement and page 134 of the Timmer
18 and Marek paper; okay?

19 A. Yes.

20 Q. On page 454 of the Timmer paper in
21 the second paragraph it defines the site of the black
22 spruce shallow site as they describe it. Do you see
23 that?

24 A. Yes, yes.

25 Q. In the Foster and Morrison paper at

1 page 77 they describe the site description in the first
2 paragraph and a little bit on page 77 on the right-hand
3 side under heading Site Description.

4 A. Mm-hmm. Yes, I have got that.

5 Q. Would you agree with me that the
6 sites are very similar?

7 A. Yes, they seem to be.

8 Q. Would you turn to page 81 of the
9 Foster and Morrison article, the last paragraph it
10 says:

11 "In summary, potential nutrient removals
12 associated with full-tree harvesting were
13 much greater than those associated with
14 conventional stems-only logging. There
15 appear to be sufficient nutrient reserves
16 and replenishment at this site after
17 full-tree logging, despite the restricted
18 rooting depth and volume to sustain the
19 next generation of spruce in the early
20 growth period. Thereafter, nutrient
21 drain on the soil reserves will be
22 reduced by the extent that nutrients
23 needs are met by the nutrient cycling
24 within the tree and stand. These
25 conclusions are based on the assumption

1 that soil nutrient reserves will be
2 protected from leaching and erosion by
3 rapid revegetation."

4 Do you agree with me, sir, that the
5 conclusions that Foster and Morrison came to on a very
6 similar site to that in the Timmer paper were
7 different?

8 A. Well, on the face of it that seems to
9 be the case, yes, they are different.

10 Q. Why wasn't this article produced as
11 part of your witness statement? Any particular reason
12 for not --

13 A. No, no particular reason.

14 Q. Did you feel it was important to cite
15 articles which gave a different point of view?

16 A. Well, I would hope to get some kind
17 of balance in the articles, yes.

18 Q. In your direct testimony, Dr.
19 Hutchinson, on page four thousand -- pardon me, 43278
20 at lines 9 to 11, you stated as follows:

21 "Now, as I say, this Timmer paper that
22 I've referred to in fact recommends that
23 we not be cutting on moderate sites."

24 A. Mm-hmm.

25 Q. I suggest to you, Dr. Hutchinson,

1 that the Timmer paper does not say any such thing. No.
2 1, I suggest to you that the Timmer paper says that you
3 could cut on all sites but recommended that some be
4 bole-only; is that --

5 MADAM CHAIR: What page are you on in the
6 witness statement, Mr. Freidin?

7 MR. FREIDIN: All right. If you can go
8 to the witness statement and now we have to go to
9 the -- no, I'm going in the oral evidence at page
10 43278.

11 MADAM CHAIR: Volume?

12 MR. FREIDIN: Volume 240.

13 MADAM CHAIR: Thank you. I don't have
14 it.

15 MR. FREIDIN: I will just read it to you,
16 it's very short.

17 MS. SWENARCHUK: Excuse me, I'm not sure
18 it is short. I think that this statement should be
19 seen in the context of the discussion that preceded it,
20 as to what type of cutting actually Dr. Hutchinson was
21 describing when he made that statement.

22 Perhaps it would be fair if Dr.
23 Hutchinson could see the statement and the context in
24 which the comment was made.

25 MADAM CHAIR: Do you have Volume 240 Ms.

1 Swenarchuk?

2 MS. SWENARCHUK: This one I believe is
3 from the Board office.

4 MR. FREIDIN: This is the Board copy, in
5 fact -- well, why don't we just let him see it.

6 MR. CASSIDY: I might have a copy he
7 could use.

8 MADAM CHAIR: Thank you, Mr. Cassidy.

9 MR. CASSIDY: I have a draft which I'd be
10 happy to give to the witness, and if the page numbers
11 don't correspond, if Mr. Freidin shows me and I can --

12 MS. SWENARCHUK: May I ask, Madam Chair,
13 if this is the Board copy, would there be more than one
14 copy available to the Board?

15 MADAM CHAIR: Mr. Pascoe would know that.
16 Would he be around?

17 Thank you.

18 MR. FREIDIN: Mr. Cassidy has --

19 MR. CASSIDY: I have a draft.

20 MR. FREIDIN: An early issue with
21 different page numbers. Oh here, I think I've got it.

22 MR. CASSIDY: There it is. Stroke of
23 luck, Mr. Freidin.

24 MS. SWENARCHUK: Okay. So what I'm
25 requesting is that Dr. Hutchinson be given time to

1 review that statement and the context in which it was
2 made.

3 THE WITNESS: I will try and do that very
4 quickly.

5 MS. SEABORN: This is the official
6 transcript. (handed)

7 THE WITNESS: What page?

8 MR. FREIDIN: 43278 is the page number,
9 lines 9 to 11.

10 Q. All right, Dr. Hutchinson?

11 A. I think so, yes.

12 Q. And we can agree that the comment you
13 made about the Timmer paper was that it recommended
14 that we not be cutting--

15 A. Mm-hmm.

16 Q. --on moderate sites. That's your
17 characterization of the recommendations?

18 A. Mm-hmm.

19 Q. And would you agree with me, sir,
20 that that is an inaccurate reflection of the article;
21 firstly, because the article indicates that you can cut
22 all sites but recommended that some only be cut using
23 the tree-length method only.

24 And I think if you turn to page 465 of
25 the Timmer article and you look at the recommendations,

1 I believe I am correct.

2 A. The first recommendation, is that the
3 one you're looking at, conventional logging methods
4 exclusively be used on shallow fragile till sites?

5 Q. That's right. And so what I'm saying
6 is, you were wrong in your evidence when you said that
7 this article recommends that we not be cutting -- not
8 be cutting on moderate sites, in terms of even fragile
9 sites they say conventional logging is all right; they
10 don't say no cutting.

11 A. Yeah, right, conventional logging.
12 Actually in my witness statement I say conventional
13 logging too.

14 Q. All right. So if you were wrong on
15 that, would you also agree that the Timmer paper does
16 not say what your evidence -- your oral evidence said,
17 it doesn't say that there is anything wrong with
18 cutting even full-tree on moderate sites; the concern
19 is in relation to marginal sites only?

20 A. They say someplace moderate sites.
21 I'm going to have to find it.

22 Q. All right. Would you please do that.
23 Would it surprise you if it wasn't referred to as
24 moderate anywhere in the paper?

25 A. In the witness statement it's a quote

1 from Gordon. In the witness there's a quote from
2 Gordon.

3 Q. All right. Let me look at the
4 witness statement, just hold on.

5 A. Sorry.

6 MADAM CHAIR: Which page is that, Dr.
7 Hutchinson?

8 THE WITNESS: Page 12 of witness
9 statement 1.

10 MADAM CHAIR: Thank you.

11 MR. FREIDIN: Q. And where is this
12 referred to in Gordon?

13 A. Well, it seems to be on page 115.
14 Okay. The Gordon article is - I don't know what number
15 it is - but it's by Gordon only.

16 Q. I don't think the important thing
17 is -- that I want to deal with is whether it's in the
18 Gordon article, and you can deal with this later if you
19 want, Ms. Swenarchuk, but are you telling me that the
20 comment --

21 MS. SWENARCHUK: I think he should be
22 permitted to answer the question. He has attempted to
23 give the Board an explanation, Mr. Freidin, and I think
24 he should be permitted to do that. And you are, of
25 course, free to ask any questions you wish after that.

1 MR. FREIDIN: Q. If it will save time, go
2 ahead, Dr. Hutchinson.

3 A. The moderate quote is from Gordon in
4 the witness statement.

5 Q. Now, where in the witness statement
6 do you refer to moderate sites so I just know where we
7 are talking about?

8 A. Page 12.

9 Q. Yes.

10 A. Two thirds of the way down the page
11 he says this --

12 Q. Should be done on moderate to low
13 fertility--

14 A. --to low fertility sites, page 114 of
15 the Gordon article.

16 Q. All right. Now, when he says 'he',
17 he's not referring to Timmer; is he?

18 A. I don't think so, no.

19 Q. All right. Well, that's all I'm
20 asking about.

21 A. Yes, that's correct.

22 Q. So Timmer--

23 A. Yes.

24 Q. --does not say anything about
25 moderate sites?

1 A. No..

2 Q. Just so we get the record clear--

3 A. Right.

4 Q. --your evidence was incorrect when
5 you said that Timmer recommended that there be no
6 logging on moderate sites?

7 A. That's correct. It seems it was
8 Gordon and not Timmer.

9 Q. Well, let's turn - now that we're
10 there, let's deal with Gordon while we have it open at
11 the page. It's at page 11 of the witness statement and
12 you deal with Gordon on pages 11 and 12. So if you
13 could get that article in front of you

14 MR. CASSIDY: Can I have my transcript
15 back?

16 MR. LINDGREN: (handed)

17 MR. FREIDIN: Q. Again it's in first
18 source book, Madam Chair. Do you have that, Dr.
19 Hutchinson?

20 A. The Gordon article and the witness
21 statement, yes.

22 Q. All right. You have quoted near the
23 bottom of the page from Gordon and that is in the
24 indented form; is that correct?

25 A. Mm-hmm.

1 Q. You then leave the quotation and you
2 say:

3 "Gordon points out that leaching losses
4 following crop removal will be large in
5 the first few years."

6 Dr. Hutchinson, I suggest to you that you
7 have taken Mr. Gordon's words out of context, that in
8 fact Dr. Gordon did not in his article put any
9 qualitative aspect to the size of the losses of
10 nutrients in the first two full years.

11 MADAM CHAIR: Mr. Freidin, are you on
12 page 12?

13 MR. FREIDIN: No, I'm on page 11 at the
14 very bottom.

15 MADAM CHAIR: Thank you.

16 MR. FREIDIN: Sorry. It says, there's
17 the quote and then it says:

18 "Gordon points out that leaching
19 losses crop removal will be large."

20 Q. And I'm suggesting to you again, just
21 so that it's clear, that you have taken what Gordon has
22 said out of context because Gordon does not ascribe
23 any qualitative aspect to the losses which occur during
24 the first few years. And if I can assist you--

25 A. Mm-hmm.

1 Q. --if you turn to page 113 of the
2 Gordon article, on the top 113 --

3 MADAM CHAIR: Ours are numbered
4 differently. How many pages in is that?

5 MR. FREIDIN: Oh, goodness. Yours don't
6 have numbers on the bottom of the pages. It's four
7 from the back.

8 Oh, there's two Gordon papers?

9 MADAM CHAIR: Yes.

10 MR. FREIDIN: This is the one entitled:
11 Nutrient Cycling Dynamics in Differing Spruce and Mixed
12 Wood Ecosystems.

13 MADAM CHAIR: The one I have before that
14 is the Fuller article. Hold on, it may have come in
15 after.

16 MS. SWENARCHUK: No, the reason for that,
17 Madam Chair, is that the Gordon, '82 paper was a
18 previous exhibit and we did not include it in the
19 source book, previous exhibits, it's Exhibit 423.

20 Dr. Hutchinson, let's just be clear, that
21 you have the one that Mr. Freidin is referring to,
22 Nutrient Cycling Dynamics?

23 THE WITNESS: Yes.

24 MS. SWENARCHUK: All right.

25 MR. FREIDIN: So just so I know the Board

1 does not have a copy.

2 MADAM CHAIR: We do have a copy, Mr.
3 Freidin, of Exhibit 423, page 113.

4 MR. FREIDIN: Oh you do have a copy.
5 Yes.

6 Q. I just want to discuss the change
7 that you have made, Dr. Hutchinson. It says on page
8 113:

9 "It has been shown...", referring to
10 Likens,

11 "...that losses from leaching were
12 greatest in the first two years following
13 harvesting."

14 A. Right.

15 Q. I suggest that's all Gordon says, he
16 does not give it any qualitative aspect such as you
17 have ascribed to him as describing them large, small or
18 anything else.

19 A. On page 114 of Gordon, if we just
20 flip across the page--

21 Q. Yes.

22 A. --he says, first full paragraph down,
23 "Harvesters, therefore, which strip the
24 branches from the bole before extraction
25 and leave them on the growing site are

1 much to be preferred to those which, as
2 in full-tree logging, draw the top soil
3 down in from the boles."

4 Q. Yes.

5 A. "On sites of moderate to low
6 fertility two advantages are apparent;
7 substantial amounts of the nutrient
8 capital are left on site..."
9 Don't you take that to mean he's
10 recommending you leave the nutrient capital on site on
11 moderate --

12 Q. Let's not change the subject matter,
13 Dr. Hutchinson. I asked you a question as to --

14 A. I'm not changing it.

15 Q. I asked you a question whether or not
16 Gordon described the losses in the first two years as
17 being large, leaching losses. You described the
18 leaching losses in this paper in your witness statement
19 as being large, and I'm suggesting to you that the
20 paper that you were citing, and Dr. Gordon that you
21 were referring to, doesn't do that?

22 A. Well, I have quoted Gordon, that's
23 Gordon's quote.

24 Q. But that quote doesn't ascribe any--

25 A. Right.

1 Q. --qualitative aspect to the loss
2 through leaching as being large, medium or small; all
3 he's saying is that you remove a certain amount of
4 nutrients from the site and they are different.

5 A. Well, he's saying that on moderate to
6 low fertility, if you leave -- if you strip the
7 branches from the bole before extraction and leave
8 them, then these following advantages accrue, and these
9 are directly related to nutrient retention on site, and
10 he says moderate to low fertility.

11 Q. "Making less nitrogen available for
12 leaching in one case as opposed to the
13 other."

14 There's a difference, in my respectful
15 submission, Dr. Hutchinson, between saying that there
16 was an increase in the two years as opposed to
17 characterizing the increase as being large in the two
18 years. Do you agree or disagree, and I think we can
19 get on with that?

20 A. Yes, yes, I believe that's true.

21 Q. You agree that's a difference?

22 A. That would be difference, yes, but do
23 I say that anywhere?

24 Q. You say that on page 11 of your
25 witness statement at the bottom where you say:

1 "Gordon points out that leaching losses
2 following crop removal will be large in
3 the first few years."

4 You have agreed that there's a difference
5 between what Gordon said - and I thank you very much
6 for that. So we can move on to the next thing. Your
7 reference at the bottom of page 11, the subject matter
8 is leaching losses.

9 A. Right.

10 Q. In Gordon, in the quote that I have
11 referred you to where they are talking about the
12 differences in leaching losses due to full-tree
13 harvesting as opposed to bole only, Gordon does make a
14 comment with a qualitative aspect to it, he says:

15 "From leachate data recorded for forest
16 land elsewhere and from the foregoing
17 cycling and crop removal data, estimates
18 are shown in Table 6 of increased
19 replacement times for nitrogen and
20 calcium."

21 This is the same place at the top
22 right-hand corner of page 113. It goes on in the fifth
23 line and says, the fourth line, comparing the
24 differences in replacement times for bole-only versus
25 full tree:

1 "Increases were relatively small (7 years
2 on the average for nitrogen and 5 years
3 for calcium)."

4 Now, Gordon puts a qualitative aspect on
5 the leaching losses, bole-only versus full-tree
6 harvesting, he says they're relatively small.

7 A. Leaching losses.

8 Q. Leaching losses.

9 A. Yes.

10 Q. You're talking about leaching losses
11 in this particular part of the witness statement. Is
12 there any reason that you didn't bring that particular
13 conclusion of Gordon to the attention of the Board?

14 A. Throughout this witness statement I
15 am talking about nutrient losses in total, that would
16 include leaching plus what's removed with your biomass
17 removal.

18 Q. Dr. Hutchinson, do you believe it's
19 important for this Board to understand the difference
20 or the magnitude of leaching losses of bole-only versus
21 tree-length if one of the things they are trying to
22 decide is how they should react to a concern about
23 bole-only versus tree-length?

24 A. Absolutely, that would be the one of
25 the things, that's right.

1 Q. That's one of the things, but you did
2 not bring the -- qualifying the statement by Gordon
3 that he felt that the losses in terms of leaching were
4 small if you compare bole-only versus tree-length, and
5 I just wanted to know if you agree, as you have just
6 done, that it's important to understand the magnitude--

7 A. Yes, I do.

8 Q. --why you didn't bring it to the
9 attention of the Board or even include it in your
10 witness statement?

11 A. Because I think in this case the
12 focus on Gordon's article was on removal from site. I
13 have a lot of other information on leaching losses.

14 Q. Well, wait a minute, removal from
15 site. We're talking about the effect of removing
16 biomass; i.e., full-tree versus tree-length, on losses
17 of nutrients, one way in which they can be lost,
18 according to your evidence and everybody else's, is
19 through leaching.

20 A. That's right, yes.

21 Q. So I want to get onto another subject
22 matter, but we agree that that's an important thing for
23 the Board to know that the leaching -- the differences
24 in leaching losses is small?

25 A. What you're saying is that though I

1 gave lots of other examples of leaching losses for a
2 site, I didn't specifically point to the Gordon article
3 for leaching losses. I pointed at it instead for
4 biomass losses and nutrient losses as a result of
5 biomass removal.

6 Q. And you characterize your comment
7 that Gordon points out that leaching losses following
8 crop removal will be large, is not making any reference
9 to leaching in the Gordon article? Come now.

10 A. We are back on page 11, eh?

11 Q. What do you mean by regeneration in
12 the second last line on page 11?

13 A. The second last line, it means that
14 as plants re-establish themselves on the site they will
15 begin to take up nutrients that are available on site.

16 Q. Okay.

17 A. And that will gradually reduce the
18 losses from site.

19 Q. So regeneration doesn't just talk
20 about tree species, it's any sort of herbacious shrubs?

21 A. Yes.

22 Q. And I guess that -- if we look at
23 page 113, if you look at 113, where we've been looking
24 before, that's really the last five lines of the quote,
25 you changed revegetation to regeneration. I don't make

1 any comment about that, but that's where that comment
2 comes, that's why you have ascribed that position to
3 Gordon; right?

4 A. Yes.

5 Q. And the section of that paragraph
6 that you didn't put in is the part inbetween, the one
7 that talks about replacement times.

8 A. That's right.

9 Q. All right, fair enough. Would you go
10 to page 12 of your witness statement. You see the
11 second full paragraph which begins:

12 "Stores in phosphorus..."

13 Page 12 of your witness statement.

14 A. Yes, I've got that, yes.

15 Q. It ends by saying:

16 "It is on these sites that nutrient
17 stress can be expected following
18 full-tree harvesting."

19 I assume that that is a fairly important
20 conclusion in your evidence? We're talking --

21 A. Yes, yes.

22 Q. All right. I suggest to you, Dr.
23 Hutchinson, that if you turn to page 114 of the Gordon
24 article --

25 MR. FREIDIN: 114 of the Gordon article.

1 Q. Item No. 7 on the left-hand side, and
2 I suggest to you, Dr. Hutchinson - and I will give you
3 a chance to read it - that except for the first word,
4 the paragraph on page 12 of the witness statement is
5 identical with Item 7, except you've changed a couple
6 of words again. You've changed Gordon's words who
7 says that:

8 "Sites --", pardon me,

9 "...it is on these sites...", in the last
10 sentence:

11 "...that nutrients might just be
12 expected...", you changed that, for some
13 reason, to say that:

14 "Nutrient stress can be expected."

15 It's identical, and you have changed the
16 emphasis; have you not?

17 A. Well, I can't actually see that on
18 the page--

19 Q. Well, no, I want you to find --

20 A. --but if I've changed the wording in
21 that way, yes, I've changed the emphasis.

22 Q. Why?

23 A. Why? Because presumably that's what
24 I felt was the case.

25 Q. So you were going on -- All right.

1 Are you suggesting, sir, that in the second paragraph
2 on page 12 that you are not purporting to indicate what
3 Gordon's view was?

4 A. Well, I guess I'm interpreting
5 Gordon. I've said other points which Gordon makes
6 which I consider important also.

7 Q. That's right and you've quoted him.

8 A. That's right.

9 Q. You actually quoted him and changed
10 two words.

11 A. Looks like it.

12 Q. So was it not your intention, or
13 would it not be the assumption of anybody reading this
14 material that that paragraph on page 12 of the witness
15 statement, when it was in effect saying Gordon
16 concluded that nutrient stress can be expected. Would
17 you agree that that's a reasonable interpretation?

18 A. That's a reasonable interpretation.

19 Q. And you've agreed with me that that
20 is different in terms of intent than someone saying it
21 might be expected, and I want to know why you ascribe
22 to Gordon words that weren't even his?

23 A. Well, I haven't actually ascribed
24 them to him, as you have been kind enough to point out,
25 but I guess the real question is: Why does he say

1 possibly and I say can.

2 Q. Perhaps maybe he's done some studies
3 and you haven't in this area, could that possibly be a
4 reason, Dr. Hutchinson?

5 A. That would be a sort of inverse
6 reason; wouldn't it?

7 Q. Well, could it be reason?

8 A. Well, I think phosphorus is a very
9 important element which is --

10 Q. What is?

11 A. Phosphorus is a very important
12 element in the -- it's one of those which is not
13 replaced to any great extent by your precipitation.

14 Q. Let's move on to another article.
15 Let's turn to the study by Malkonen, 1973 article.
16 This is Malkonen, it's called: Effect of Complete Tree
17 Utilization on the Nutrient Reserves of Forest Soils.

18 A. Yes.

19 Q. You'll find this referred to on page
20 13 of the witness statement.

21 A. I have got my own.

22 MADAM CHAIR: Here it is.

23 MR. FREIDIN: Q. Do you have that?

24 A. Yes.

25 Q. Well, we may be able to do most of

1 this without any pages, Dr. Hutchinson.

2 A. Okay.

3 Q. Page 13 of the witness statement you
4 refer to Malkonen, first full paragraph. I think you
5 have made a number of mistakes here, I don't know
6 whether it was in proofing this material or whether you
7 would describe it as carelessness or what, but I want
8 to make sure that the record is straight.

9 In the third line would you agree that
10 the reference -- you say:

11 "In the pine stands...", second line,
12 "...full-tree harvest increased losses of
13 nitrogen or phosphorus by 2.5 times that
14 of bole-only harvest and in spring."

15 Would you agree that that should be spruce?

16 A. That's right, yes.

17 Q. Thank you. Go down to the next
18 paragraph.

19 "He comments for this particular New
20 England site..", that's wrong too; isn't
21 it?

22 MS. SWENARCHUK: You're reading it wrong,
23 excuse me.

24 MR. FREIDIN: Q. "For his particular New
25 England sites."

1 Was the Malkonen article dealing with New
2 England sites, or was it dealing with sites in Sweden?
3 I suggest to you it was Sweden.

4 A. If you don't mind, I will just have a
5 look at the page and see. Well --

6 Q. Yes or no; was it New England or was
7 it Sweden?

8 A. Well, he's based in Helsinki which is
9 Finland and I don't see that he mentioned either sites
10 in his paper. Now, I don't know where I got New
11 England from.

12 Q. Neither do I, that's why I asked you
13 the questions.

14 A. He's somewhere between Sweden and New
15 England.

16 Q. Makes a difference, I suggest to you,
17 whether it's Sweden or New England, Dr. Hutchinson; do
18 you agree?

19 A. It makes a difference where it was,
20 but I don't know what degree of difference. It depends
21 what the point was.

22 Q. Well, you were the one that was
23 making the point, you were the one who wasn't very
24 careful in terms of identifying where it was, so that's
25 why I asked you.

1 A. Well, I don't think at the moment
2 either of us have the evidence that it wasn't New
3 England.

4 Q. Okay.

5 A. I don't know where I pulled New
6 England out of the hat from, but there seems to be some
7 good reason for saying that.

8 Q. Well, would you turn to the next
9 page. Well, if you find a good reason for saying that
10 over the break, you come back and tell me, okay.

11 Page 14 underneath the quote at the top
12 of the page:

13 "He...", I guess referring to Malkonen,
14 "...goes on to comment that in order to
15 maintain the fertility of forest boles
16 it may be necessary to replace the
17 nutrients by fertilization."

18 That's a mistake too; isn't it, Dr.
19 Hutchinson, it should say forest soils I think. You
20 see that if you turn to page 382.

21 A. Yes, it says soils.

22 Q. Is that right?

23 A. Yes.

24 Q. How do all these errors get made?
25 These are other errors that you didn't pick up when you

1 proofed this paper?

2 A. Looks like it.

3 Q. Now, this article also -- may I
4 continue?

5 MR. MARTEL: You're talking about soils
6 from here as opposed to boles in this article?

7 MR. FREIDIN: That's right, and that's
8 the point I'm making. I'm just point out that for some
9 reason a number of these errors were made.

10 Q. And the last matter I want to suggest
11 that you made an error on in terms of your witness
12 statement in this article is in the second line when
13 you say::

14 "In the pine stands...", or I believe you
15 have,

16 "In pine stands full-tree harvest
17 increased losses of nitrogen or
18 phosphorus by 2.5 times."

19 Can we agree that this is an article
20 which dealt with whole-tree harvesting as opposed to
21 full-tree?

22 A. Yes, you can.

23 Q. Could we move to Freedman and Duinker
24 which is Tab No. -- it's Tab 5 in my book, it's page 14
25 of the witness statement, Freedman, I think it should

1 be, Duinker and Morash.

2 MR. CASSIDY: What page is that of the
3 witness statement?

4 MR. FREIDIN: You will find it on page
5 14.

6 MR. CASSIDY: Thank you, Mr. Freidin

7 THE WITNESS: Do I need the article
8 itself?

9 MR. FREIDIN: Q. Yes, sir. Do you have
10 that, Dr. Hutchinson?

11 A. Yes.

12 Q. Now, page 14. All right. On page
13 14, of this article you have reproduced some numbers
14 that they have in their report, you have indented it;
15 do you see that?

16 A. Yes.

17 Q. You have then said:

18 "Relative to the total soils store,
19 they...", I assume 'they' refers to the
20 authors of the article, Dr. Hutchinson?

21 A. Yes, that's right.

22 Q. "...they suggested only calcium
23 depletion was a problem for the second
24 generation."

25 Just hold on a second. I suggest to you

1 that, again, you have taken the conclusions of these
2 authors out of context, that you have ascribed to them
3 qualitative aspects which, for some reason, you wish to
4 ascribe to them and, in that regard, I refer you to the
5 abstract of this paper, and would you go to the last
6 paragraph on page 103 where it says:

7 "It seems unlikely that one or several
8 whole-tree harvests of these natural
9 stands, if done on rotations of greater
10 than 50 years, would result in important
11 depletions of site nutrient capital."

12 And then they say:

13 "However, calcium removal as a percentage
14 of total site capital were large. This
15 may...", and I emphasize 'may',
16 "...be a cause for concern and warrants
17 further investigation."

18 A. Right.

19 Q. I suggest to you, Dr. Hutchinson,
20 when we're talking about whether or not something
21 should or should not be done as a result of full-tree
22 harvesting, there's a difference and a significant
23 difference between a conclusion that says that there
24 was a problem for second regeneration, and one that
25 suggests there might be one and that warrants further

1 investigation. Do you agree or disagree?

2 A. Well, I see the words you pointed out
3 and my words are:

4 "Relative to the total soil store, they
5 suggested that..."

6 Q. Would you agree that -- surely we can
7 agree whether the article says what it says, Dr.
8 Hutchinson. Will you agree with me, please, that what
9 you have said in your witness statement is not the
10 conclusion of the authors, in fact they say it might be
11 a problem and you say it was a problem, and that that
12 is a significant difference?

13 A. No, I haven't said that they've said
14 it was a problem, in fact I've pointed out that they
15 had data which suggested that calcium might ultimately
16 be a problem in second regeneration. I don't see a
17 great discrepancy between what I said and what they
18 have got here.

19 Q. Just so we have it clear in my mind,
20 when you say on page 14 that the authors:

21 "They suggested only calcium depletion

22 was a problem..", means the same thing --
23 gives rise to the same level of concern as a statement
24 that says, it may be a cause for concern and warrants
25 further investigation?

1 A. You're reading halfway through the
2 sentence, with due respect. I mean, you know, that's
3 again, you're coming in halfway through the sentence,
4 you're missing out --

5 Q. I read the whole paragraph to you.

6 A. "Relative to the total soil store
7 they suggested..."

8 You haven't read that out yet, you've
9 started each time saying:

10 "Only calcium depletion..."

11 Q. Where are you referring to?

12 A. My statement immediately below the
13 Table on page 14.

14 Q. And where do they say "relative to
15 the total soil store" that calcium was a problem
16 in this article?

17 A. Relative -- do you mean where do they
18 say that?

19 Q. Yeah. Well, you said they did.

20 A. Okay.

21 Q. You show me where.

22 A. Well, I'm just pointing out to you
23 that I used the words 'they suggested', and you seem to
24 don't say that I just said it was, and I was more
25 cautious than that.

1 Q. Okay. Let's --

2 A. Well no, you really want to find this
3 out.

4 "Within this dataset...", this is quoting
5 from them,

6 "...only the calcium comparisons --"

7 Q. I'm sorry, can you tell me where
8 you're reading from, please?

9 A. End of the abstract, first paragraph:

10 "Within this dataset only the calcium
11 comparisons indicate a short-term cause
12 for concern with respect to
13 impoverishment of site nutrient capital
14 by whole-tree harvesting."

15 I really don't see any great huge
16 difference between that and what's written down here,
17 they suggested only calcium.

18 Q. Well, all right, look it. We aren't
19 going to agree what your words convey to the normal
20 reader, I think I've asked enough questions on it and
21 we'll leave that matter.

22 But while you're on that one that you
23 referred me to, it says:

24 "Within this dataset only the calcium
25 comparisons indicated a short-term cause

1 for concern..."

2 A. That's right.

3 Q. "...with respect to impoverishment."

4 Now, short-term cause for concern, what
5 do you think they meant by that?

6 A. I presume it meant during the first
7 generation.

8 Q. Well, you don't think maybe -- you
9 think it means during the first rotation. Could we
10 turn to the Timmer and Ray paper, you will find that
11 referred to on page 15 of the witness statement. Do
12 you have that one?

13 A. Yes, I do.

14 Q. Timmer and Ray, Evaluating Soil
15 Nutrient Regime for Black Spruce in the Ontario Clay
16 Belt by Fertilization.

17 Would you agree with me, Dr. Hutchinson,
18 that the purpose of this study was to report on
19 different methods or approaches to measuring nutrients
20 on site and to validate Timmer's current research
21 regarding foliar vector diagnosis?

22 A. Right, yes.

23 Q. Would you agree with me, Dr.
24 Hutchinson, that it was not a study dealing with the
25 effects of full-tree or tree-length harvesting on site

1 productivity?

2 A. Yes, Yes.

3 Q. In your paper, in your witness
4 statement on page 15 you make the comment in relation
5 to nitrogen, which was the subject of -- one of the
6 subjects of interest, if not the subject of interest,
7 of Timmer. You say in the third paragraph:

8 "Using diagnosis by vector analysis of
9 current needle responses in terms of dry
10 weight increases and macronutrient
11 concentrations and contents of needles,
12 they found that of all the nutrients
13 which they added nitrogen was the most
14 commonly and severely limiting for black
15 spruce."

16 I just want to focus on the phrase
17 'severely limiting'.

18 A. Right, okay.

19 Q. Will you agree with me that the
20 author makes the general comment that for black spruce
21 nitrogen is the most limiting of nutrients, but that he
22 did not characterize that limitation as severe or in
23 any other manner as you have suggested on page 15?

24 A. Okay. He doesn't appear to use the
25 word severe.

1 Q. Do you want some help with that one?

2 A. I don't see the word severe so far
3 anyway.

4 Q. I didn't, I'll refer you to where
5 they talk about this, because I wouldn't want to leave
6 the Board with the wrong impression. Go to page 44.

7 A. Okay.

8 Q. Go to the first full paragraph, go
9 down about 12, 13 lines over to the left, it says:

10 "Interpretations based..."

11 Do you see that? Go down the left-hand
12 column:

13 "Interpretations based on vector length."

14 A. Yes, okay.

15 Q. It says:

16 "Interpretations based on vector
17 length and the diagnostic guide in Figure
18 1 suggests that of all nutrients tested
19 in Figure 2, nitrogen was the first
20 limiting followed by phosphorus, calcium
21 and magnesium."

22 If you go down to the bottom of the
23 right-hand side of the page they make another comment
24 about the limiting nature. In the second -- pardon me,
25 in the third line of the last paragraph on that page it

1 says:

2 "Of all nutrients analyzed...", do you
3 see that?

4 A. Yes.

5 Q. "...only nitrogen was correlated
6 significantly and inversely with
7 potential fertilizer responses. This was
8 expected since vector diagnosis indicated
9 Nitrogen to be the most limiting nutrient
10 for many of these stands."

11 Now, those are the references to nitrogen
12 being limiting, no surprise to anybody, but we agree
13 that they did not ascribe any qualitative aspect to
14 that limiting factor as being severe or anything else;
15 agreed or disagreed?

16 A. They point out that nitrogen is the
17 most limiting factor in this study followed of
18 phosphorus.

19 Q. Sure.

20 A. Yes.

21 Q. And the fact that it might be most
22 limiting, I'm just saying, that doesn't necessarily
23 mean it's severely limiting; does it?

24 A. No, it doesn't necessarily mean that.

25 Q. Thank you. Can we go to the Maliondo

1 article, you'll see that referred to on page 15 of your
2 witness statement

3 MS. SWENARCHUK: Which one?

4 MR. FREIDIN: This is the Maliondo, 1988
5 article: Possible Effects of Intensive Harvesting on
6 Continuous Productivity of Forest Lands.

7 Q. Okay. Do you have that one?

8 A. Yes.

9 Q. Now, if we look at page -- first of
10 all, do you agree this was a literature review?

11 A. This study?

12 Q. Yes, this paper was a literature
13 review.

14 MS. SWENARCHUK: Excuse me.

15 MR. FREIDIN: I'm sorry.

16 MS. SWENARCHUK: I'm still not clear,
17 you're referring not to this one which is 1990, but to
18 1988?

19 MR. FREIDIN: The 1988 one, that's
20 correct. I am not referring -- put it another way, I
21 am not referring to Exhibit 1409.

22 MS. SWENARCHUK: Okay. Thanks, Mr.
23 Freidin.

24 MR. FREIDIN: Q. Okay.

25 A. It's principally a literature review,

1 yes.

2 Q. You're looking at the wrong document.

3 I'm sorry, Dr. Hutchinson, that's the 1990.

4 MR. CASSIDY: No.

5 MR. HUFF: He's looking at the right one.

6 Q. Oh, you've got the right one. Good.

7 I'm sorry, different picture, sorry. I got -- which
8 one do you like the best. It was a literature review?

9 A. Yes.

10 Q. There was no new data produced
11 through a study by Maliondo?

12 A. Well, if you just bear with me I will
13 just have a quick glance through at the scope of this
14 study, page 11.

15 Q. Aren't you familiar enough with the
16 study to know that without looking at it, Dr.
17 Hutchinson?

18 A. Well, in the other one they have a
19 lot of data on their own site. So, you know, I'm not
20 sure whether they have in this one or not.

21 Q. Oh no, no no, no no. They may be
22 reporting on their own sites in past studies, I want to
23 know if there are any new study result published for
24 the first time by Maliondo --

25 A. No, it's a review.

1 you suggesting, Dr. Hutchinson, that significant enough
2 damage occurs to a forest floor during full-tree
3 harvesting to cause gullying during rainstorms or
4 springtime snow melt; yes or no?

5 A. Well, unfortunately I can't give you
6 a yes or no answer, I would to qualify it.

7 Q. Why couldn't you?

8 A. Because it depends on how much damage
9 you've done.

10 Q. And I'm suggesting to you, Dr.
11 Hutchinson, that in normal timber management practices,
12 harvest practices--

13 A. Mm-hmm.

14 Q. --the evidence to date in this
15 hearing, and the evidence which is correct, and I'm
16 suggesting to you that --

17 MS. SWENARCHUK: Excuse me, Mr. Freidin,
18 that's an inappropriate comment.

19 MR. FREIDIN: All right, I won't have to
20 characterize it that way.

21 Q. I suggest to you, Dr. Hutchinson, that
22 during normal timber management harvesting activities--

23 A. Mm-hmm.

24 Q. --the forest floor is not damaged to
25 the extent that you get gullying during rainstorms or

1 if the forest floor is in place?

2 A. That's right.

3 Q. Whose statement is this, is this your
4 view or is this a view which Maliondo has reported?

5 A. I think it's a commentary which
6 certainly includes Maliondo, but I don't think I'm
7 ascribing that to him specifically.

8 Q. ut, if you do not get gullying during
9 rainstorms or, you know, if you have got the forest
10 floor in tact--

11 A. Mm-hmm.

12 Q. --then the statement that you have
13 made, and I read it to you again.

14 "In full-tree harvests this slash is gone
15 exposing the soil to summertime baking
16 and to gullying during rainstorms or
17 springtime snow melt", would only be true
18 if, in addition to removing the slash, you also removed
19 the forest floor.

20 A. If you damage the forest floor, yes.

21 Q. You make reference --

22 A. It would be remarkably difficult to
23 take off all the trees like that without damaging the
24 forest floor and certainly --

25 Q. Are you suggesting then that -- are

1 Q. Thank you.

2 A. But they have a lot of studies of
3 their own in it.

4 Q. Yes. Now, on page 16 of the witness
5 statement you make a comment, and I'm looking now in
6 the first full paragraph and looking in the middle,
7 going down about five lines, it says:

8 "In bole-only harvest slash protects...",
9 got that?

10 A. Yes.

11 Q. It says:

12 "In bole-only harvest slash protects the
13 forest floor and also provides a mulch
14 which absorbs the moisture; in full-tree
15 harvest this mulch is gone."

16 When you say 'mulch', you're talking
17 about slash.

18 A. Yes, yes.

19 Q. "This mulch...", or slash, "...is
20 gone exposing the soil to summertime
21 baking and to gullyng during rainstorms
22 or springtime snow melt."

23 A. Mm-hmm.

24 Q. Would you agree with me, Dr.

25 Hutchinson, that you do not get gullyng of the forest

1 springtime snow melts.

2 A. Well, the evidence I think that
3 Forests for Tomorrow will be presenting would disagree
4 with you on that.

5 Q. Are you able to indicate whether such
6 incidents which might be reported where such gullying
7 during rainstorm or during springtime snow melt do
8 occur are frequent or infrequent?

9 A. No, I couldn't comment on that.

10 Q. Thank you. You make a comment as
11 well in this paragraph, following on I'll just read the
12 rest of the paragraph to put things in context. You
13 say:

14 "The normal microbial decomposers which
15 utilize the forest floor litter and
16 slash, experience a depleted nutrient and
17 lignin content in the soil, and often a
18 changed pH, and are exposed to high
19 temperatures."

20 It's the next sentence that I'm going to
21 want to ask you some questions about. It states:

22 "The organisms in place in the forest
23 floor to recycle the essential elements
24 by decaying organic debris are radically
25 changed."

1 Am I correct, Dr. Hutchinson, that that
2 is a comment that you make based upon reliance on
3 Maliondo in his paper?

4 A. I don't think that is based entirely
5 on Maliondo. I mean, are you really asking me to
6 recall exactly what I was thinking about when I wrote
7 that? This seems to be more in the nature of a
8 commentary on the Maliondo article.

9 Q. Well -- I'm sorry, it tends to be...?

10 A. A commentary.

11 Q. Commentary on Maliondo?

12 A. Stemming from Maliondo, yes.

13 Q. Well, in answer to MNR No. 14, and I
14 didn't file this because I didn't think I would have to
15 refer to it.

16 MNR 14 to Panel 1, this quote was put to
17 you and a number of questions were asked and you
18 stated - the preamble to the question, you said:

19 "The statements being questioned are
20 based directly on the review paper of
21 Maliondo."

22 One of the questions was:

23 "Does FFT agree that the radical change
24 in the organisms in the forest floor in
25 temperate climates involves a population

1 increase which generally results in
2 an increase in the rate of decay of
3 organic debris. If Forests for Tomorrow
4 does not agree, please provide the
5 reasons and the sources."

6 And you said:

7 "The statements being questioned are
8 based directly on the review paper of
9 Maliondo."

10 Now, were you right when you answered the
11 interrogatories?

12 A. Sorry, I hate to delay things but
13 could you just read me the quote that --

14 Q. All right. There's a better way to
15 deal with this. I'm sorry, we'll have to make a copy
16 of it and I will put it to you tomorrow.

17 A. Okay. I see a piece of Maliondo
18 which relates to the questions that I'm being asked.
19 He's referring to some other work by Martin, 1986 and
20 he says on page 1 of his review --

21 Q. What page are you looking at?

22 A. Page 1 of Maliondo's review.

23 A. The right-hand side, top paragraph
24 and then two thirds down, he says:

25 "Other potential detrimental..."

1 Q. Wait.

2 A. Sorry. So we're on Maliondo,
3 introduction.

4 Q. Okay, I've got you.

5 A. Okay. Two thirds of the way down:
6 "Other potential detrimental effects of
7 whole-tree harvesting include increased
8 nutrient leaching, soil compaction by
9 logging machinery, exposure of mineral
10 soil and erosion, a shift in decomposable
11 microbial populations."

12 Well, those statements I have made there
13 are about erosional losses or gullying and decomposing
14 would fit directly in with that statement from
15 Maliondo's paper.

16 Q. How are they radically changed, these
17 organisms?

18 A. Sorry?

19 Q. How are these organisms radically
20 changed?

21 A. Well, you'll have -- normally in the
22 forest floor there will be -- have a damping down of
23 the outside the forest dyonal temperatures in the
24 summer months, so they don't -- the forest floor, they
25 wouldn't get the extremes of high in the summer that

1 they get once the forest is removed. So one of the
2 changes would be that you might lose microbial
3 populations because of extremes of temperature.

4 Q. Would you agree with me, Dr.
5 Hutchinson, that you get an increase in microbial
6 populations after both full-tree harvesting and
7 tree-length harvesting?

8 A. You get an increase in certain types,
9 yes.

10 Q. Well, can you agree that you get an
11 increase -- all right, in certain types. And as a
12 result of the increase in microbial action after
13 harvesting, could you agree that you get more
14 decomposition?

15 A. Yes, you would get speeding up of
16 nitrification.

17 Q. And you agree that happens after both
18 full-tree harvesting and after bole-only?

19 A. That's right.

20 Q. Is it nitrification or mineralization
21 that occurs?

22 A. Nitrification. Well, particularly in
23 conventional harvesting it would be nitrification, but
24 nitrification. You might get an acceleration on the
25 waterlogged sites from denitrification too.

1 Q. I'm sorry.

2 A. On waterlogged sites, as sites become
3 waterlogged, you might get an increase in
4 denitrification too.

5 Q. Fair enough. Let's move to Anderson
6 which is at the bottom of page 16. I think that we can
7 deal with this one fairly quickly, Dr. Hutchinson.
8 Bottom of page 16 where you talk about --

9 A. I've got the witness statement there.
10 I'll just find.

11 Q. Okay.

12 A. Right, I've got it.

13 Q. Okay. This was an article which
14 revolves around an intensively harvested plot under
15 conifers in Scotland according to your witness
16 statement?

17 A. Right.

18 Q. You make a comment that:

19 "Within 18 months of harvest, 15
20 centimetres of the forest floor was
21 lost."

22 Do you have any evidence that this occurs
23 or could occur in the boreal forest of Ontario due to
24 decomposition?

25 A. Anderson's study is indicating that

1 there's a loss of organic matter from the forest floor,
2 substantial within 18 months. And your question is:
3 Could this happen here too?

4 Q. No, I asked whether that loss could
5 occur in the forest floor in a boreal forest due to
6 decomposition, I'm talking about decomposition of the
7 forest floor.

8 A. 18 inches in--

9 Q. 18 months -- no, 15 centimetres in 18
10 months.

11 A. Okay. I think you would have to go
12 and measure it, that's a pretty substantial rate of
13 loss. I'm not sure.

14 Q. Are you able based on your -- so
15 you're unable to help us on that one?

16 A. I would be -- I think we would
17 struggling to find sites where it's as high as that.

18 Q. What was the purpose of including the
19 comment in your paper then, what conclusions were you
20 seeking the Board to come to?

21 A. The point is, of course, that there
22 is organic loss from sites following -- in this case, a
23 conventionally harvested plot.

24 Q. So you're saying that the number --
25 the depth lost and the time frame over which it was

1 lost is then irrelevant for the purposes of the Board
2 making any decision?

3 A. The point of the quote is that in
4 fact there's organic losses from sites as a result of
5 harvesting.

6 Q. But it's not a quote, Dr. Hutchinson.
7 I assume when you put something in your witness
8 statement such as the time period over which a, which
9 you describe as a large amount, of forest floor is
10 lost, did you put it in there because there is some
11 relevance or significance to it, you want the Board to
12 take note of it for some reason. Isn't that a fair
13 assumption for me to make?

14 A. Yes, very fair.

15 Q. But now you've told me that you don't
16 know whether that would even happen in Ontario.

17 A. Mm-hmm.

18 Q. And so I ask: Why would you include
19 the numbers? I mean, it seemed a bit dramatic.

20 A. Well, I don't know whether people
21 think 15 centimetres loss of forest floor is dramatic
22 or not.

23 Q. You said it was a lot.

24 A. The point of this is, that this was
25 about twice the amount lost under an intensively

1 harvested stand of conifers than under a conventionally
2 harvested one.

3 Q. Okay. Let's move on.

4 A. And that's the sole point of that.

5 Q. Now, I've asked you some questions on
6 hydrology. We were talking about the Likens study and
7 you referred in your witness statement to a number of
8 what I would call hydrological studies where nutrients
9 were measured in streams.

10 A. Yes.

11 Q. And am I correct that the point that
12 you were attempting to make was that an increase in
13 nutrients measured in the streams after harvest
14 indicates that there have been losses from the site,
15 that's where the nutrients are coming from, and that,
16 therefore, there's a possible effect on site
17 productivity as a result?

18 A. Yes, yes.

19 Q. Okay. Now, I've reviewed the Martin,
20 Pierce, Bormann and Likens paper with you. If I could
21 just go back to that one just for a moment. the
22 nineteen seventy -- no, 1985.

23 MADAM CHAIR: Do you want to take the
24 break now, Mr. Freidin?

25 MR. FREIDIN: Yes, this would be as good

1 a time as any.

2 MADAM CHAIR: Let's do that.

3 MR. FREIDIN: Are we going to four
4 o'clock today or five o'clock?

5 MADAM CHAIR: We're going to four o'clock
6 and then we're going to be talking about Forests for
7 Tomorrow's Panel 2.

8 MR. FREIDIN: Thank you.

9 ---Recess taken at 2:40 p.m.

10 ---On resuming at 3:05 p.m.

11 MADAM CHAIR: Please be seated.

12 Mr. Freidin, the Board has received some
13 correspondence and we would like to make this sort of
14 material an exhibit as it comes in, so if you don't
15 mind we will just give this an exhibit number. This
16 will be Exhibit No. 1427, and this is correspondence
17 from a Ms. Paton Lodge Lindsay who appeared before the
18 Board at the satellite hearing in Sault Ste. Marie.

19 And she has sent to us a copy of a
20 two-page letter dated September 24th, 1990 that she has
21 sent to a Mr. Lannin at the Ministry of Natural
22 Resources office in Blind River, and attached to this
23 - letter is a four-page - one of which is double sided -
24 correspondence in handwriting to the Board describing
25 her concern about the size of clearcuts essentially in

1 the Peschu Timber Management Unit.

2 So together this will be Exhibit 1427.

3 ---EXHIBIT NO. 1427: Two-page letter dated September
4 24th, 1990 from Ms. Paton Lodge
5 Lindsay to Mr. Lannin, MNR, Blind
6 River District, with four-page
7 handwritten correspondence
8 attached.

9 MADAM CHAIR: Mr. Freidin?

10 MR. FREIDIN: Q. I think, if you don't,
11 Dr. Hutchinson, could you have the paper by Martin,
12 Pierce, Likens and Bormann: Clearcutting Effects in
13 Stream Chemistry in the White Mountains of New
14 Hampshire.

15 A. Yes, I do.

16 Q. At page 8 -- would you turn to page
17 8, please. These questions may be a little out of
18 context because I've already -- this is the paper where
19 we had that discussion about proportions and
20 proportionately, so I just sort of got the left-over
21 questions here, if you will.

22 A. Okay.

23 Q. On page 8 on the left-hand side of
24 the page in the last sentence --

25 MADAM CHAIR: Excuse me, Mr. Freidin, I
think I'm on the wrong Likens. Is this the 1970?

MR. FREIDIN: 1979. Or maybe it's '85

1 '85.

2 MS. SWENARCHUK: Martin, Pierce; isn't
3 it?

4 MR. FREIDIN: Martin, Pearce, Likens and
5 Bormann.

6 MADAM CHAIR: Got it.

7 Q. Page 4 -- I'm sorry, page 8. First
8 full paragraph, last sentence it says:

9 "Losses of nutrients in particulate
10 matter due to erosion were not considered
11 but are likely to have been small."

12 Are you able to agree with the belief of
13 the authors in relation to that subject matter?

14 A. That's referring to the Bormann and
15 Likens Hubbard Brook study?

16 Q. Right.

17 A. Yes.

18 Q. This is the clearcutting -- this is
19 Martin, Pierce, Likens and Bormann, Clearcutting in the
20 White Muntains of New Hampshire.

21 They said that they didn't measure losses
22 of nutrients in particulate matter due to erosion
23 because they were likely to have been small, and I'm
24 just wondering whether you can agree that losses due to
25 erosion; i.e. paragraph particulate matter, would be

1 small; therefore, that their statement is a reasonable
2 one?

3 A. Well, I have no reason to disagree
4 with them. That's based on their own observations,
5 presumably on their own studies, so I have no reason to
6 disagree.

7 Q. Okay. And in terms of revegetation,
8 again this was a study of clearcutting. You will see
9 under Discussion on page 9:

10 "Clearcutting northern hardwood
11 ecosystems sets in motion complex
12 hydrological, biogeochemical and
13 ecological changes. Removal of the
14 forest canopy...", and it says what it
15 does, increases a number of things, and then it says:

16 "These changes in turn trigger a complex
17 array of vegetative growth responses so
18 that cut-over sites are revegetated
19 quickly."

20 And they talk about that happening within
21 a few years.

22 A. Yes.

23 Q. Do you agree that the study in fact
24 supports the conclusion that after clearcutting that
25 those cut-over sites revegetated quickly?

1 A. Yes.

2 Q. Pardon me?

3 A. Yes, yes. I think that is fair.

4 Q. Do you have any reason to believe
5 that the situation is any different in the boreal
6 forest of Ontario?

7 A. Well, it may be a little slower, but
8 it will -- I mean, revegetation does take place in the
9 boreal forest. They have a special -- they have the
10 special sort of characteristic of pin cherry there
11 which is one of these species that captures a lot of
12 nutrients and in the original Hubbard Brook study they
13 deliberately left vegetation on the site, and then as
14 we have already discussed, used herbicides. So that
15 will be a bit different in the original Hubbard Brook
16 study to this one.

17 Q. Right. This study is one which more
18 closely--

19 A. Yes.

20 Q. --approximates timber management
21 activities as opposed to the 1970 report; right?

22 A. These are all commercial clearcuts in
23 this case.

24 Q. All right, thank you. Could you turn
25 to page 25 of your witness statement -- 24 of your

1 witness statement, please, Natural Clearcuts. Now, you
2 make reference on page 24 to the paper by Sopper that
3 we have already spent some time on.

4 A. Mm-hmm.

5 Q. And this report is referenced in the
6 part of your witness statement dealing with changes in
7 site hydrology following clearcutting; correct?

8 A. Yeah.

9 Q. That's the title we find on page 22.

10 A. Right, yes.

11 Q. Okay. You cite the general
12 conclusions of Sopper in the middle of the first full
13 paragraph on 24, and I think we actually referred to
14 that earlier in this examination. It says, starting
15 five lines down:

16 "Some of the examples he uses...",
17 referring to Sopper,

18 "...to reassure the reader that
19 "in general research result indicates
20 that nutrient losses, particularly
21 nitrogen following forest clearcutting
22 are small to negligible" do not in fact
23 reassure."

24 I think that comment there is consistent
25 with your evidence this morning when we were discussing

1 this and you said you didn't necessarily agree with
2 that particular part of their conclusion.

3 And you then -- and you tell me if I'm
4 mischaracterizing your evidence, because it seems that
5 you then go on from there to cast doubt on that
6 conclusion by reference to the results of one of the
7 papers that Sopper refers to and, in particular, the
8 report by DeByle and Packer. Is that a fair statement?

9 A. Yes, that's fair.

10 Q. And DeByle and Packer is one of the
11 reports that we will find in the source book?

12 MS. SWENARCHUK: I think this one was
13 filed later, so...

14 MR. FREIDIN: Does the Board have that,
15 Madam Chair?

16 MADAM CHAIR: Yes, we do, Mr. Freidin.

17 MR. FREIDIN: Thank you.

18 Q. Can you take a look at page 25 of
19 your witness statement, and you have reproduced some
20 numbers in terms of kilograms per hectare of various
21 elements which, I take it, were measured in the
22 overland flow in that particular study; is that
23 correct?

24 A. Well, yes, I think so.

25 Q. You see right at the bottom there's

1 "(Source: DeByle and Packer, 1972)?

2 A. Right, Yes.

3 Q. So I accept that reference. What's
4 the point that you're attempting to make by
5 reproduction of those numbers?

6 A. Okay. Well, just looking at the
7 table, the losses seem to be -- the treatment gives you
8 substantial increases in phosphorus, especially
9 phosphorus and calcium. Well, I guess everything
10 really.

11 Q. All right. So I take it then the
12 point of reproducing those is to make the point that
13 there's a substantial increase in terms of the loss of
14 those particular elements?

15 A. Yes, I would think that was the
16 point.

17 Q. And you're making that point in an
18 attempt to respond to the general conclusion of the
19 paper with which you disagreed; is that a fair
20 statement?

21 A. Very likely, yes.

22 Q. Well, you wrote the paper; is it or
23 isn't it?

24 A. I would imagine that is why I put
25 that in, yes.

1 Q. Okay, thank you.

2 A. I'm sorry, I don't have perfect
3 recall as to why I put it in. It's interesting I put
4 in a paper that seemed to be disagreeing with
5 everything.

6 Q. Well, I thought that was interesting
7 and so I went and I read the paper and I have some
8 questions about it.

9 Do you agree that results of scientific
10 papers are only meaningful for Ontario if the
11 conditions are similar to Ontario, and now I'm talking
12 about the results in terms of absolute numbers, the
13 magnitude of losses.

14 A. Oh yes, the absolute numbers, you
15 could get big variation right across Ontario as well.

16 Q. Are you able to indicate whether the
17 conditions in the DeByle and Packer study are similar
18 enough to the situation in Ontario to make it
19 reasonable to use the figures as an indication of what
20 will actually occur in terms of nutrient losses after
21 clearcutting in Ontario?

22 A. Well, I have never made that
23 assumption anywhere in my witness statement.

24 Q. All right. So then we are not to
25 look at these figures and ascribe any significance to

1 the magnitude of the losses; is that correct?

2 A. That's right. It would be -- the
3 thing, the take away message, if there is one here,
4 would be to do with patterns; that is, that phosphorus,
5 potassium, calcium, et cetera, are increased.

6 Q. All right. This I guess gets it
7 back -- this is much like the other passage that we
8 talked about where you talked about losses and
9 patterns.

10 A. Mm-hmm.

11 Q. If you go to the bottom of page 24,
12 after indicating that we should look at this paper
13 because we shouldn't have perhaps as much comfort
14 because of the Sopper general conclusion, you say:

15 "However, the losses are shown in the
16 original author's table."

17 And then you give the actual losses and
18 you're saying that the numbers in those tables are of
19 no significance and should be given no weight?

20 A. No, I'm not saying that. I'm
21 saying --

22 Q. Well, then how are they --

23 A. You can't make an extrapolation from
24 these absolute numbers here measured in a study that I
25 think was done in the western United States to Ontario.

1 Q. So the numbers could have gone the
2 other way?

3 A. No, the numbers -- how do you mean,
4 had a reversal of control versus treated? I doubt it.

5 Q. But, I just want to be clear. So
6 that we're not -- the losses -- you're just trying to
7 show another article that showed that losses occurred
8 after harvesting and you weren't trying to show
9 anything in terms of the magnitude of those losses?

10 A. I would think I was trying to show
11 that the magnitude of these losses can be substantial.

12 Q. But if we're concerned about what the
13 losses might be in Ontario--

14 A. Mm-hmm.

15 Q. --I would suggest to you that it is
16 misleading to cite an article which cites large numbers
17 in terms of the losses if the situation which gave rise
18 to those large losses in the article don't exist or
19 exist in extremely few cases in the area of the
20 undertaking.

21 A. Are you suggesting you can't
22 extrapolate in terms of patterns from one place to
23 another in terms of clearcutting and forest cutting?

24 Q. I'm suggesting exactly that, Dr.
25 Hutchinson.

1 A. Okay.

2 Q. And do you say that you can?

3 A. Yes, I think so.

4 Q. I'm talking about quantities now.

5 A. Oh, no, not in quantities.

6 Q. Okay.

7 MS. SWENARCHUK: He said cutting.

8 THE WITNESS: But there has never been
9 the slightest suggestion that numbers -- it depends on
10 slope, soil types, rainfall, season, et cetera. There
11 is no way you can expect to do that.

12 MR. FREIDIN: Q. Will you turn to page
13 305, DeByle and Packer.

14 A. 305, okay.

15 Q. I was going to go to a whole bunch of
16 different sections, but let's see if I can just cut
17 this short.

18 On page 305 under the heading Overland
19 Flows and Soil Erosion they indicate on the right-hand
20 side, five lines down:

21 "On the other hand...", this is just
22 below figure 23, page 305, five lines below Figure 23,
23 it says:

24 "On the other hand, because of the random
25 occurrence of summer storms which

1 occurred in this particular study, the
2 overland flow and erosion experienced
3 from them during the two years that these
4 plots were relatively denuded cannot be
5 used for predicting runoff and erosion on
6 similarly treated areas elsewhere,
7 they serve instead only as examples."

8 So you would agree with that statement?

9 A. Yes.

10 Q. Would you agree also that the soil
11 exposure on this study was extensive?

12 A. It was on steep slopes I think, yes,
13 and they had some clearance, yes. Yes, I think it was.

14 Q. Was there anything else which had
15 caused soil exposure?

16 A. They had a storm.

17 Q. All right. Was it an unusual storm?

18 A. Was it unusual? Do you mind --

19 Q. Would it make a difference if it was
20 unusual, or do you know if it was an exception in a
21 region?

22 A. Well, it might affect the actual
23 numbers, but they still had, you know, treated and
24 untreated, so you would still have a comparison.

25 Q. Let's try to shorten this. Let's

1 just see if you can agree, on page 305 they indicated
2 that in this study, same place, but just looking at the
3 next paragraph--

4 A. Yes. It says there was an intense
5 summer storm which partially denuded some of the area,
6 so...

7 Q. And then it says:
8 "Fortunately extremely high intensity
9 storms are the exception in this region
10 of western Montana and northern Idaho."

11 A. Right, yes.

12 Q. Okay, let's move on. Let's go to
13 another article that you cite in relation to nutrient
14 losses being measured in streams, let's refer to the
15 Schindler article which you refer to on page 28. Okay.

16 You quote Schindler, and that was a study
17 done in Ontario; is that correct?

18 A. Right, yes.

19 Q. And you quote him on page 28 in the
20 indented part, and in the first sentence you say:

21 "After the fire, losses of phosphorus and
22 nitrogen from watersheds via the streams
23 were less than 40 per cent of the annual
24 inputs from snow, rain and dustfall."

25 And I take it one of the things you were

1 talking about here was trying to compare the amount of
2 nutrients lost after fire as opposed to after
3 clearcutting; is that correct?

4 A. Yes.

5 Q. If one was concerned about quantities
6 of loss, would it make any difference if that first
7 sentence read:

8 "After the fire, annual losses of
9 phosphorus and nitrogen from watersheds
10 via the streams were less than 40 per
11 cent of the annual inputs from snow, rain
12 and dustfall"?

13 In other words, if one added -- if we
14 were looking at annual losses from fire, would that
15 make a difference in the significance of the statement?

16 A. Well, I don't know. It might make
17 some difference.

18 Q. Well, if one was trying -- my sense
19 of it is, Dr. Hutchinson, that it would make a
20 difference. If one was trying to say how much of the
21 nutrients do you lose in absolute amounts from fire,
22 and how much do you lose from clearcutting.

23 If what you lose from clearcutting is
24 "x".

25 A. Right.

1 Q. And what you lose is "y", all right. \

2 A. For fire?

3 Q. For fire.

4 A. Okay.

5 Q. If actually you don't lose "y" but
6 you lose three times "y", it would make a significant
7 difference in terms of the comparison?

8 A. Mm-hmm, yes.

9 Q. Right?

10 A. Yes.

11 Q. Now, tell me whether it was an error,
12 tell me whether it wasn't an error, or was some other
13 reason: Why does the word annual not show up in this
14 quote?

15 If you turn to page 334 of this article
16 and you look at the second last full paragraph in the
17 left-hand column, it is an identical quote but, again,
18 I'm wanting to know why the word annual, which does
19 have significance as you have just admitted, does not
20 appear in your witness statement?

21 A. It looks like it's an error.

22 Q. Another error?

23 A. If you like, yes, it's another error.

24 Q. And, Dr. Hutchinson, did you vet this
25 witness statement for errors?

1 A. No, I didn't really. I mean, I
2 thought I had, but you have pointed out a few of them.

3 Q. And do you believe that there may be
4 more? If I continue do, you think that we're going to
5 find some more of these?

6 A. It's possible.

7 Q. It's possible.

8 A. I don't really think that changes the
9 meaning of that at all. I was struggling to see your
10 point, but I think it really doesn't make too much
11 difference.

12 Q. Now, it doesn't make any difference.

13 A. Well, I said that from the beginning.
14 I said I wasn't convinced it did.

15 Q. Well, we will let the record speak as
16 to whether that's what you said or not.

17 A. All right, fine.

18 Q. I want to refer to Exhibit 1422 which
19 is a paper by Martin, Noel and Federer entitled:
20 Clearcutting and Biogeochemistry of Streamwaters in New
21 England.

22 MR. MARTEL: Could I go back, Mr.
23 Freidin. I'm having difficulty with the significance
24 of leaving the word annual out of that statement at the
25 beginning of the paper.

1 MR. FREIDIN: I think -- put it this
2 way --

3 MR. MARTEL: Is it that it's just an
4 error?

5 MR. FREIDIN: I don't know whether it's
6 an error. Well, it is an error in that the word --.

7 MR. MARTEL: I mean, the word is not
8 there.

9 MR. FREIDIN: If the word -- if it was
10 read without the word, 'After the fire total losses of
11 phosphorus and nitrogen were 40 per cent...', my
12 questioning is suggesting, and I'm asking Dr.
13 Hutchinson to agree, that there's a difference between
14 saying, 'after the fire total losses are that', and
15 saying, 'after fire annual losses are that'.

16 THE WITNESS: With respect, that wasn't
17 the question you asked me.

18 MR. FREIDIN: Q. Well, let me put it to
19 you that way then. Is there a difference --

20 A. But it doesn't say total losses, I
21 haven't taken one out and added one in, there has been
22 one dropped by accident, and I'm suggesting it doesn't
23 really make much difference to the meaning.

24 Now, you've added in total which really
25 would being to point out some difference between total

1 and annual.

2 Q. Okay. So we can disagree on how that
3 should be interpreted, but if it is reasonable to
4 interpret your quote here--

5 A. Yes.

6 Q. -as saying that the total losses of
7 phosphorus and nitrogen are such and such, when in fact
8 the statement in the article says annual, that is a
9 significant difference, assuming for the moment --

10 A. Well, if we're assuming that somebody
11 has put in total, then that would make some difference,
12 yes; but nobody has.

13 Q. Well, I interpreted it when I read it
14 without the word 'total' there and without the word
15 'annual' there that it meant total. Are you suggesting
16 to me that that was an unreasonable interpretation?

17 A. Yes, I think so.

18 Q. Fine. Martin, Noel and Federer,
19 Exhibit 1422. Would you refer to the abstract please.
20 I want to read part of it to you and ask whether you
21 agree or disagree.

22 MADAM CHAIR: Hold on, Mr. Freidin.

23 MR. FREIDIN: I'm sorry.

24 MADAM CHAIR: Exhibit 1422?

25 MR. FREIDIN: 1422, that's correct.

1 Q. Okay. You have that?

2 A. Yes.

3 Q. The headnote of that states - and
4 this was in New England - halfway down on the
5 right-hand side:

6 "Changes in streamwater chemistry and
7 biology clearcutting forest lands does
8 affect streams throughout New England;
9 however, the magnitude of differences is
10 such that if erosion and sedimentation
11 are controlled clearcutting as practised
12 by foresters today does not drastically
13 change streamwater chemistry or biology."
14 Do you agree or disagree with that
15 general comment?

16 A. Yes, I do.

17 Q. This particular study; am I not
18 correct, Dr. Hutchinson, actually looked at
19 streamwaters, after various portions of watersheds were
20 cut, they looked at one where it may have been 10 per
21 cent and different kinds of percentages?

22 A. Okay. Yes, that's right.

23 Q. Okay. And in terms of this issue of
24 erosion and sedimentation, and when we're talking about
25 erosion and sedimentation, when water gets to a stream

1 through erosion and sedimentation it's over groundflow;
2 right, as opposed to groundwater which is under the
3 surface--

4 A. Right.

5 Q. --of the soil?

6 A. Mm-hmm.

7 Q. Okay. It says on page 686 in the
8 third full paragraph on the right-hand side of the
9 page:

10 "Clearcut watersheds selected for the
11 study all contained skid trails, most
12 contained landings and truck roads.
13 Little evidence of sedimentation was
14 found in the streams studied. We did not
15 investigate specific problems of erosion
16 and sedimentation caused by timber
17 harvesting operations. Such problems can
18 be avoided by use of known techniques."

19 Do you agree or disagree that not only in
20 this forest area but in the boreal and the Great Lakes/
21 St. Lawrence area such problems can be avoided by the
22 use of known techniques?

23 A. Of course, yes, they can certainly be
24 minimized.

25 Q. And to the extent that they would be

1 avoided, would you agree that the effects could be
2 properly characterizd as potential effects?

3 A. Well, in practice the other paper by
4 Martin in the same year says that basically there -- in
5 fact, it's the one I referred to earlier, the Martin,
6 Bormann -- Martin, Likens, not Martin Bormann - Martin,
7 Likens paper points out that the findings they've got
8 there are quite similar in pattern to the Hubbard Brook
9 study.

10 So if that was a commercial clearcut that
11 was done in that study and in these here, then they're
12 repeating the same pattern in terms of nutrient losses
13 as a result of clearcutting, and part of that perhaps
14 is erosional losses, we don't know.

15 Q. Pattern --

16 A. Pattern of nutrients.

17 Q. But not losses in terms of absolute
18 quantities?

19 A. No, I have never suggested in
20 absolute quantities.

21 Q. So when we're talking about
22 magnitude--

23 A. Yes.

24 Q. --which you indicated in your earlier
25 responses to me was an important thing to consider when

1 one is talking about effects.

2 A. Mm-hmm.

3 Q. This paper indicates in the headnote,
4 and I suggest to you it is the opinion of those authors
5 that the magnitude of differences is such that if
6 erosion and sedimentation are controlled, clearcutting
7 as practised by foresters today does not drastically
8 change streamwater chemistry or biology?

9 A. They certainly say that, and they're
10 probably right, but unfortunately in this paper they
11 give everything in concentrations, they don't give any
12 volumes, any flows. So you really can't calculate from
13 this study as to whether, you know, the magnitude of
14 the losses. It's entirely based on concentrations.

15 They also -- you know, there's a lot of
16 problems with this paper. I don't suppose you want to
17 hear about them.

18 Q. Okay. Let's move on. During
19 cross-examination by Ms. Seaborn who represents the
20 Ministry of the Environment you were referred to an
21 article by Dr. Methven, that's Exhibit 1421.

22 MS. SWENARCHUK: Carlisle and Methven.

23 MR. FREIDIN: Carlisle and Methven,
24 Exhibit 1421.

25 Q. All right. Have you got that?

1 A. Yes.

2 Q. Oh, all right, sorry. Now, Dr.

3 Hutchinson, you were referred to some evidence of Dr.

4 Methven, I believe it was during the Industry's

5 evidence, in which he said or he indicated that it was

6 his opinion that there should not be restriction on

7 full-tree harvesting. Do you remember that being put

8 to you?

9 A. Yes, yes.

10 Q. Now, when this article was put to

11 you, you indicated that this paper seemed to be at

12 variance with Dr. Methven's evidence. Do you remember

13 saying that?

14 A. Yes.

15 Q. Now, Dr. Methven's evidence, are you

16 aware sir, that it was given in the context of

17 full-tree harvesting for timber management purposes,

18 that's what he was talking about when he gave his

19 evidence?

20 A. Yes, I think I was aware of that.

21 Q. And that was your assumption when you

22 gave your evidence?

23 A. Yes.

24 Q. Could you refer to page 1 of this

25 witness statement.

1 A. Of my witness statement?

2 Q. I'm sorry, not witness statement,
3 page 1 of Exhibit 1421.

4 A. Of the Carlisle and Methven paper?

5 Q. Yes.

6 A. Okay.

7 Q. Introduction, left-hand side:

8 "The purpose of this report is to provide
9 an overview of the impact of harvesting
10 whole trees and use of short rotations
11 for energy purposes."

12 Energy Forests, if you turn over to page
13 No. 2, under the heading Energy Forests, we get a
14 little bit of a better idea what this is about, and it
15 says:

16 "The development of energy forests of
17 fast growing species harvested..", under
18 the heading Energy Forests,

19 "The development of energy forests of
20 fast growing species harvested after
21 short rotations of two to ten years to
22 provide feedstocks for alcohol plants and
23 gasifiers is a major departure from
24 conventional forestry practices."

25 A. Mm-hmm.

1 Q. He also makes the comment, if you go
2 back to the first page on the right-hand side under the
3 heading Roundwood Harvesting--

4 A. Right.

5 Q. --and roundwood harvesting, he refers
6 to, it would be timber harvesting, he says in the
7 second paragraph:

8 "Harvesting for energy, however, is an
9 entirely different matter. In order to
10 use wood fibre for methanol, for
11 example, it is economically desirable to
12 harvest and utilize whole trees...", et
13 cetera.

14 Now, would you agree, sir, that the
15 purpose of this paper deals with a situation which is
16 not full-tree harvesting in the normal timber
17 management scenario we're talking about, energy forests
18 we're talking about -- Dr. Methven's talking about
19 harvesting on rotations of two to 10 years. That's
20 what it says; is that right?

21 A. It's to do with short, yes, it's to
22 do with short rotation harvests, yes.

23 Q. Okay. Now, if we turn to page No. 7
24 where we talk about Dr. Methven's -- the focus of his
25 article, he says under the heading The Impact of Short

1 Rotations:

2 "So far the nutrient income and outgo has
3 been considered in whole-tree harvesting
4 systems only on relatively long
5 rotations. The recent trend in forestry
6 to grow trees on rotations as short as
7 two to 10 years has presented new
8 problems."

9 And he goes on to talk about this
10 situation and he describes on the next page, in the
11 very first full paragraph, when he's trying to compare
12 what he's talking about in this article and what he was
13 perhaps talking about -- or what he was talking about
14 the in the evidence was, he says:

15 "These systems..", he's talking about
16 energy forests,

17 "...are sometimes referred to as
18 agriforestry or agroforestry systems,
19 inferring that they are analogous to
20 agriculture. They are similar to
21 agriculture in that they are short-term
22 monocultures making considerable demands
23 on even the more fertile soils...", and

24 he goes on.

25 A. Yes.

1 Q. So far very different than full-tree
2 harvesting. Would you turn to page 10.

3 A. Is that the Discussion?

4 Q. Before we get to Conclusions. I
5 guess it's the Discussion. Yes, it's the second last
6 part of the Discussion?

7 A. Okay.

8 Q. Dr. Methven says:

9 "A laborious piecemeal approach...", this
10 is going down about seven or eight lines, starting on
11 the right-hand side of the left-hand column,

12 "A laborious piecemeal approach to
13 understanding the effects of whole-tree
14 harvesting is neither necessary nor
15 practical even though the effects are
16 site-specific."

17 And he goes on talking about predictive
18 models and suggesting some co-ordinated work. Again,
19 he is saying that; is he not, in the context of energy
20 forests?

21 A. I think so, yes.

22 Q. So this article -- so that when you
23 said that Dr. Methven had contradicted himself or was
24 at variance with his evidence, he was talking about two
25 different things?

1 A. Well, there are some places in this
2 article when he does talk about full-tree harvesting
3 which is not -- at least he doesn't suggest that that's
4 in the context of short rotations, and that's where I'm
5 pointing out that they seem to be at some variance.

6 Q. And where that occurs, would you
7 agree that Dr. Methven would be a good person to hear
8 from as to whether he believes this was at variance?

9 A. No, no. I was just going on the
10 evidence in front of us. If you read the first
11 paragraph of the Discussion he suggests that under
12 certain circumstances there may be a net deficit of
13 some elements. Now, he's not talking there about short
14 rotations, I don't believe, he's talking -- and he says
15 it particularly, nitrogen and phosphorus on some sites.

16 So, yes, he's talking mainly about short
17 rotations, he is talking about full-tree harvesting,
18 and he is talking about energy forests generally
19 speaking, but he does have some comments on other
20 things too.

21 Q. That's your interpretation?

22 A. Well, it's based on whatever he gets.

23 Q. All right, thank you. I want to talk
24 a little bit about --

25 MR. MARTEL: Well, before we go on, let

1 me... On the one hand we're talking about a rotation
2 of 60, 70 years.

3 MR. FREIDIN: For some species.

4 MR. MARTEL: Possibly longer, in this one
5 we're talking about two - if I follow it - two to 10
6 years. Can we anticipate that the effects on the
7 second and third and fourth crop will be much more
8 devastating here if we were cutting and removing
9 everything than they would over a long rotation of 80
10 or 90 years?

11 THE WITNESS: In the same time period,
12 yes, but in terms of numbers of rotations not
13 necessarily so.

14 If you're talking about the hundred years
15 in one you might have 10 rotations, in the other you
16 might have one, and obviously if you try to run a short
17 rotation harvest for 10 rotations with the problems
18 he's referring to here you would not be able to
19 succeed; but if you look at one rotation in each, then
20 you might have the similar sorts of problems.

21 MR. MARTEL: Can you compare the two
22 though?

23 THE WITNESS: Well, you can compare them
24 in terms of biomass you take off per site against
25 nutrient losses you take off per site compared to

1 nutrient reserves per site.

2 I think on the short-term rotations, to
3 maintain that sort of energy forest you would have to
4 have nutrient inputs, you would have to have fertilizer
5 inputs; whereas if we want to maintain sustainability
6 in the boreal forest, then without fertilizer
7 applications then we've got to consider what the
8 reserves are left on site and look at it in that
9 context.

10 So I think the comparison is between one
11 rotation each or two rotations each.

12 MR. FREIDIN: Q. Would you agree, sir,
13 that the reference to what this energy forest might
14 mean for Ontario, as we find that on the page where
15 Table No. 5 is reproduced, that is the table that Mr.
16 Cassidy referred you to --

17 MADAM CHAIR: Mr. Freidin, are we still
18 on the same article?

19 MR. FREIDIN: We are still on the same
20 article.

21 MADAM CHAIR: 1421?

22 MR. FREIDIN: Yes.

23 MR. CASSIDY: I didn't refer to Table 5,
24 I referred to Table 4.

25 MR. FREIDIN: I'm sorry. If you turn to

1 the page with Table 5 on it.

2 MADAM CHAIR: Do you want Table 5, Mr.
3 Freidin?

4 MR. FREIDIN: I'm sorry?

5 MADAM CHAIR: Do you want Table 4 or 5?

6 MR. FREIDIN: Five. The pages aren't
7 numbered, and just so to put this perhaps into some
8 perspective, in terms of Ontario, the sort of thing one
9 was talking about in terms of energy forests, which was
10 the focus of this article, we look at the last
11 paragraph:

12 "An approximate calculation of nitrogen
13 drain for short rotations, two to four
14 years poplar in Ontario...", and they go
15 on to suggest problems that that might refer or cause
16 in terms of nitrogen and deficits, et cetera.

17 And that was the only reference I could
18 find, Dr. Hutchinson, to the kind of rotations that Dr.
19 Methven was talking about, or being concerned about in
20 this article when he was talking about energy forests.
21 Are you aware of any other reference to Ontario
22 rotation lengths?

23 A. No.

24 Q. I think -- again, can you recall
25 being asked by the Chair whether it would take a full

1 rotation or more to replenish the site? I think we
2 were talking about replacement times for nutrients--

3 A. Right.

4 Q. --which had been removed, and I think
5 you said it would be a slow process and would take
6 longer. Did I recall your evidence correctly? More
7 than one rotation.

8 A. Well, I'm not disputing it, I'm not
9 sure what the context is the question was asked in,
10 but...

11 Q. All right. Let's put it this way:
12 you were -- I don't remember the exact context that
13 Madam Chair asked the question, but I do have a note
14 here. When you were referred to this exhibit, Exhibit
15 1421 and Table 4 by Mr. Cassidy that talked about the
16 various inputs --

17 A. Dr. Methven.

18 Q. No, no, this is another thing.

19 A. Dr. Methven.

20 Q. Yes, the Methven paper. You were
21 referred to Table 4 by Mr. Cassidy, and he asked you,
22 and this was the whistling in the wind
23 cross-examination.

24 A. All right. Right, I remember that.

25 Q. He referred to it as that, no comment

1 on Mr. Cassidy's cross-examination.

2 A. Those weren't my words.

3 Q. He asked: Are you saying that these,
4 referring to the inputs in Table 4, will not make up
5 for losses due to full-tree harvesting. And you
6 answered: In normal rotation that is the case, that is
7 based upon my reading of the literature. You went on
8 to say, in a rotation period of 80 or a hundred years.

9 A. Right.

10 Q. It would take that to replace
11 full-tree harvesting.

12 A. Yes.

13 Q. Okay. That was your evidence; is
14 that correct?

15 A. Yes.

16 Q. Are you able to point to -- let me
17 take you through a couple of articles. You went
18 through the Freedman article?

19 A. Yes.

20 Q. Freedman and Duinker article?

21 A. Right.

22 Q. Maybe we could finish off the day if
23 we get the following articles all at once. The
24 Freedman and Duinker article, Foster and Morrison 1987
25 article which is at panel 9 witness statement at page

1 80, and the Gordon article which is in source book No.
2 1.

3 MS. SWENARCHUK: Which?

4 MR. HUFF: '81 or '82?

5 MR. FREIDIN: The '82.

6 MS. SWENARCHUK: This is not the Foster,
7 Morrison article that starts at page 80.

8 MR. FREIDIN: I'm going to refer you to
9 page 80 then of the article.

10 Q. That Gordon article is Exhibit 423,
11 it's not in the source book. So I want to look at
12 Freedman.

13 A. Okay, I've got the Gordon one. I've
14 got the wrong Freedman here, I've got Freedman, Morash
15 and Hanson.

16 Q. No, I want the Freedman and Duinker
17 and Morash.

18 A. I'm sorry, I don't seem to have the
19 Freedman one at the moment.

20 MS. SWENARCHUK: Here's a copy. It's a
21 poor one. (handed)

22 MR. FREIDIN: Q. Okay. Do you have
23 those?

24 A. I have got the Freeman. Yes. Okay,
25 I think I've got them assembled.

1 Q. The reason I wanted you to look at
2 those articles, I want to just deal with this question
3 about rotation times. The issue arose during your
4 cross-examination about replacement, what happened, how
5 long does it take to replace the nutrients which are
6 removed.

7 I want to talk about -- see what some of
8 these articles say about rotation periods and how it
9 comes into play in terms of replacement and site
10 productivity.

11 On the Freedman, Duinker and Morash
12 paper, we've already looked at the last paragraph of
13 the abstract where it says that:

14 "It seems unlikely that one or several
15 whole-tree harvests of these natural
16 stands if done on rotations greater than
17 50 years would result in important
18 depletions of site nutrient capital."

19 And then he makes a comment about:

20 "However, calcium removal as a percentage
21 of the total site capital were large and
22 this may be a cause for concern and
23 warrants further investigation."

24 Would you agree that the concern here, at
25 least as expressed by the authors about rotation

1 periods, was where the rotation would be greater than
2 50 years?

3 A. Yes.

4 Q. Would you look at the Foster and
5 Morrison article in witness statement No. 9 at page --

6 A. Okay.

7 MS. SWENARCHUK: Page 80, first full
8 paragraph on the right.

9 MADAM CHAIR: Which exhibit are we in for
10 that article, Mr. Freidin?

11 MR. FREIDIN: I'm sorry?

12 MADAM CHAIR: Which exhibit are we in for
13 the Foster and Morrison article?.

14 MR. FREIDIN: I'm looking at Exhibit 414.

15 MADAM CHAIR: Thank you.

16 MR. FREIDIN: Page 80. I can't seem to
17 find the reference that I want. I will come back to
18 it. I'm sorry, Madam Chair, it must be getting late in
19 the day, my notes don't seem to be on here.

20 MADAM CHAIR: You're disappointing us, Mr.
21 Freidin, we finally found the article.

22 MR. FREIDIN: Well, just keep it there,
23 we will go back to it.

24 Q. Well, let me put it this way, maybe
25 just more generally. Are you aware of any reports

1 which when they're talking about rotation periods have
2 suggested -- or pardon me, have stated that there would
3 be a problem if you had rotations greater than 50
4 years?

5 When I read the articles I kept coming up
6 with concern if rotations were less than 50 years.

7 A. Some of the data in -- now, you are
8 going to have to bear with me because it's one of two,
9 it's either the Gordon article that we have referred to
10 today, or the Timmer and Marek article.

11 They have for some of their sites
12 rotation times, so that they think that the nutrient
13 reserves would not get you out beyond 27 years or 54
14 years, something of that kind.

15 Q. All right. I think that that is the
16 Timmer paper. Take a look at page 9 of your witness
17 statement, I think that's what you're referring to.

18 A. Yes.

19 Q. Your witness statement.

20 A. Right. Page 9?

21 Q. Page 9.

22 A. Got it.

23 Q. Is that the part I think where you
24 cited the table there with the numbers and then you say
25 under the table on page 9:

1 "These data are used to calculate how
2 long in a second generation forest the
3 total rooting depth, nutrient reserves
4 after bole and full-tree harvests will
5 last."

6 Is that the reference?

7 A. Mm-hmm.

8 Q. Would you agree with me that Timmer,
9 Savinsky and Marek didn't look at the effect of inputs
10 of nutrients from the environment either through
11 precipitation, through decomposition of the organic
12 layer, or the weathering of mineral soil, they looked
13 at it in a static way and they just looked at what was
14 there and said: If we just keep using what's there, it
15 will run out? They do; is that not right?

16 A. I'll have to get the paper out. They
17 looked at rooting depth, the reserves in the rooting
18 depth, and that includes all available from your
19 decomposition process.

20 So to answer that first part of the
21 question, did they look at inputs from decomposition,
22 well they looked at rooting depth so, yes, they did.

23 I don't recall if they looked at
24 precipitation, so they may not have done, and they had
25 a second category in which they looked at all available

1 reserves on site which was down to the sub-soil.

2 Q. Did they look --

3 A. So the only thing they may not have
4 looked at is precipitation.

5 Q. I don't think they looked at the
6 accumulation of organic matter through litterfall over
7 the rotation either; am I correct?

8 A. But that will be a component of what
9 was there to start with.

10 Q. Right.

11 A. Plus precipitation, yes.

12 Q. But do you not agree that over the
13 rotation you have a litter falling from the trees and
14 it's not just a matter over the rotation using what's
15 there, you have other things falling which eventually
16 get added and they start to decompose.

17 A. There's a build-up of biomass, yes.

18 Q. And he didn't take into account that
19 input over rotation either, I don't think. Can you
20 agree with me?

21 A. Well, I think we're having a
22 conversation here in which we probably should have a
23 look at the paper, but I prefer to defer that
24 discussion if we're going to -- I mean, I prefer that
25 we actually get the paper out and look at it, if that's

1 what you're proposing.

2 Q. There's a term called replacement
3 time.

4 A. Yes.

5 Q. Did Timmer talk about replacement
6 time?

7 A. Yes, I think he did.

8 Q. Where?

9 MS. SWENARCHUK: Can I just suggest --

10 THE WITNESS: Well, again, I'm going to
11 have to get this paper out if we're going to have this
12 sorted of conversation.

13 MR. FREIDIN: Well, that might be a good
14 time to stop for the day, Madam Chair.

15 MS. SWENARCHUK: The witness is quite
16 entitled to look at the paper.

17 MR. FREIDIN: I'm quite prepared. I
18 would hope that the witness would refer to the paper,
19 if he feels he has to for the purposes of answering my
20 questions.

21 MADAM CHAIR: And you have a copy of that
22 paper, Dr. Hutchinson?

23 THE WITNESS: Yes, I used to do earlier
24 this afternoon.

25 MADAM CHAIR: From the pile this

1 afternoon. How long will you be tomorrow, Mr. Freidin?

2 MR. FREIDIN: All day and then some
3 perhaps.

4 MADAM CHAIR: So on Wednesday, and you'll
5 be how long in re-examination?

6 MS. SWENARCHUK: I still think not
7 particularly long, certainly not more than a couple of
8 hours at the outside.

9 MADAM CHAIR: So we may finish Wednesday.

10 MR. FREIDIN: I hate to stick my neck
11 out, but I think you'll finish Wednesday.

12 MADAM CHAIR: At four.

13 MR. FREIDIN: There's a chance I'll
14 finish tomorrow, but I just can't promise.

15 MADAM CHAIR: Well, we received a letter
16 from Ms. Swenarchuk to the effect that she can't
17 produce a witness for Thursday morning - Mr. Lindgren,
18 pardon me.

19 MR. LINDGREN: That's correct, that was a
20 letter from me, Madam Chair, and we do have a witness
21 scheduled to appear on Wednesday, we can certainly
22 start with him. We may in fact be through with him.

23 That particular witness can't appear on
24 Thursday morning, so if we are not finished on the
25 Wednesday, he will have to be carried over to the

1 following Monday.

2 MR. FREIDIN: Which witness, the first
3 witness?

4 MR. LINDGREN: Mr. Paul Armstrong.

5 MADAM CHAIR: And you couldn't get any of
6 your witnesses for the following week to come on
7 Thursday?

8 MR. LINDGREN: Well, we attempted to do
9 that. There was one possibility, but I spoke to
10 counsel about that and it was agreed that that person
11 should not come until the following week.

12 MADAM CHAIR: Okay. Well, this is a
13 problem because we have lost three days of each week
14 that we've heard your case, we've lost three hearing
15 days in three weeks. Presumably this is just a
16 coincidence and it will straighten itself out and the
17 availability of witnesses won't be resulting in lost
18 hearing days.

19 MS. SWENARCHUK: We're not expecting this
20 to be a pattern, Madam Chair. Dr. Hutchinson, with
21 some difficulty, cleared his calendar for all this
22 week, if necessary, to finish his evidence this week.
23 It was not possible for him to do that earlier,
24 although you will recall we were available on Thursdays
25 and Fridays.

1 MADAM CHAIR: All right. And so the week
2 after you will have witnesses for Monday through
3 Thursday?

4 MR. LINDGREN: The Thursday witness is to
5 be confirmed, that is our intention at this point.

6 MADAM CHAIR: All right. Thank you very
7 much, Dr. Hutchinson. We're finished for today and
8 we're just going to take up some procedural matters.
9 You are welcome to stay if you want, but you don't have
10 to.

11 THE WITNESS: Thank you. I think I will
12 leave.

13 --- (Witness withdraws)

14 MADAM CHAIR: Mr. Cassidy?

15 MR. CASSIDY: Madam Chair, I just want
16 to deal with one thing that Mr. Lindgren just said on
17 the record. I may be wrong - I stand corrected if he
18 wishes to refresh my memory - but the first
19 notification I got that we would not be sitting next
20 Thursday was when I read this letter which was this
21 morning, sent out to my office, unfortunately after I
22 left on Friday afternoon after 5:30.

23 MADAM CHAIR: I thought the letter I saw
24 today had to do with this Thursday.

25 MR. CASSIDY: It does.

1 MADAM CHAIR: Oh, you said next Thursday.

2 MR. CASSIDY: I'm sorry, I meant next
3 Thursday, which is this Thursday. In any event, I did
4 not consent to no hearing being held on Thursday, it's
5 not in my power to make that consent in any event.

6 I just want it straight on the record
7 that it was -- I did not take part in the discussions,
8 I don't believe Mr. Lindgren, in which I indicated it
9 would be all right to start another witness the
10 following week instead of Thursday.

11 MR. LINDGREN: Mr. Cassidy was not the
12 counsel I spoke with on that matter, Madam Chair.

13 MADAM CHAIR: So, Mr. Lindgren, it's your
14 information you have got two parties cross-examining
15 Panel 2?

16 MR. LINDGREN: That's my information to
17 this point.

18 MADAM CHAIR: The Board as well got a
19 letter from Mr. Hanna last week that wouldn't be
20 cross-examining and the same with Ministry of
21 Environment.

22 MS. SEABORN: Yes, Madam Chair. I think
23 I said it in my letter that I would be here throughout
24 the evidence and if it's agreeable with the Board I
25 would like to reserve my right if-something arises

1 after everyone's testimony to ask a few questions. I
2 can assure the Board I will be very brief, if that is
3 the case.

4 MADAM CHAIR: That is fine, Ms. Seaborn.

5 MS. BLASTORAH: Mrs. Koven, I haven't
6 seen that letter. It may have gone through my office
7 and I just didn't get it. Is my understanding correct
8 that Mr. Hanna is not going to ask any questions of any
9 witness in Panel 2?

10 MADAM CHAIR: He won't be here.

11 MS. BLASTORAH: At all?

12 MADAM CHAIR: No.

13 MS. BLASTORAH: Okay.

14 MADAM CHAIR: A few points to start with,
15 Mr. Lindgren.

16 It would be very helpful to the Board
17 when witnesses come forward that reference is made to
18 evidence that we've had before. For example, with such
19 things as Dr. Ross Henderson, we think that in Exhibit
20 948 there is correspondence with respect to his
21 complaints about rare orchids and so forth already on
22 the record.

23 We've heard various information about the
24 Marceau Lake Cottagers Association and, as well, the
25 Peschu Lake Crown Management Unit and it's very helpful

1 for the Board, and more difficult for the parties who
2 follow the proponent, but more helpful for the Board if
3 you could point us generally to where we've heard
4 pieces of that information before, because we're aware
5 of it and we start looking ourselves, and if it's
6 simple for you to do, then we would appreciate it.

7 MR. LINDGREN: Certainly.

8 MADAM CHAIR: The Board has a few
9 comments about where it would like to see some
10 clarification, and it's quite short.

11 Our first comment has to do -- it's a
12 question that could be directed to Mr. Tunnacliffe, but
13 your other witnesses might want to think of it as well
14 and; that is, the Board would like their reactions to
15 the situation where negotiations reach an impasse
16 between all the parties concerning a timber management
17 activity or plan, and does Mr. Tunnacliffe or your
18 other witnesses see any alternative to MNR's district
19 manager making a final decision? Certainly the Board
20 understands Mr. Tunnacliffe's position -- am I
21 pronouncing his name correctly, by the way?

22 MR. LINDGREN: You are, Madam Chair.

23 MADAM CHAIR: We understand his situation
24 when he refers to imposing an ultimatum, he feels that
25 the interest of his group were simply not taken into

1 consideration. But we're saying, setting aside that
2 aspect of it, if he felt in fact his issues were
3 satisfied in some way but not completely, would he see
4 any alternative to the district manager making a final
5 decision about a final form of a timber management
6 plan?

7 With respect to Mr. Cappell's evidence --

8 MR. LINDGREN: Mr. Cappell.

9 MADAM CHAIR: Mr. Cappell, thank you.

10 Mr. Cappell's evidence, could he just briefly describe
11 for the Board which MNR licensing decisions have caused
12 difficulty for his sawmill operation. I don't want to
13 take him offtrack, because I know that his evidence has
14 to do with Forests for Tomorrow's case, but if he could
15 clarify that aspect for us, we're interested.

16 To at least four of the witnesses, we
17 would like to learn if they have heard anything from
18 Ministry of the Environment with respect to bump-up,
19 whether that be an idea of when they might get a
20 decision, whether they have been notified they will or
21 won't have a decision, have they received anything from
22 the Ministry of the Environment with respect to their
23 bump-up request.

24 The Board has a comment that is directed
25 at Ms. Blastorah and; that is, we find it unreasonable

1 that the MNR is asking for these lay witnesses to
2 provide the scientific basis for the recommendations
3 that they are making with respect to the interests of
4 the various groups.

5 I think this is in a statement of issue
6 filed by the Ministry where it's repeated a few times,
7 and I believe, Mr. Cassidy, the OFIA does the same
8 thing where you ask for the scientific basis for the
9 proposals of various groups, whether they be cottage
10 associations or whatever, and the Board finds this a
11 strange sort of question to put to these people.

12 MS. BLASTORAH: Perhaps I could explain
13 our position. I will certainly let Mr. Cassidy speak
14 for himself, but I think the position the Ministry
15 takes - and frankly we're just seeking information - we
16 did ask, I think, for interrogatories on this and I
17 would have to check, but our position is the witnesses
18 have stated in their evidence what concessions were
19 made or what steps were taken by the Ministry in the
20 plan to addressing their concerns are inadequate and,
21 in many cases, those concerns are cited as concerns for
22 the natural environment, for instance.

23 And given that the witnesses - I
24 appreciate that they are lay witnesses - are saying
25 that the steps that have been taken are inadequate,

1 what we're trying to establish is, on what basis
2 they're saying that. And, I mean, if it's simply an
3 emotional reaction, or if it's a personal view based on
4 their perception, that's fine, but I think it's
5 incumbent upon us to ask if there is some scientific
6 basis on which these people are making that statement,
7 if they have somebody they'd asked about it or
8 something that they've read, so that we can address
9 that in cross-examination.

10 Without having asked that, or at least
11 notified the other parties of that, I think it wouldn't
12 be fair to the witness to cross-examine him, and I
13 don't think it's fair to the Ministry if we don't have
14 that information if they're going to be relying on it.

15 I think it's important that the Board as
16 well as the Ministry know on what basis those witnesses
17 are saying that protections offered are inadequate.

18 MR. CASSIDY: I agree with those
19 comments, and I might also add that if a witness says
20 I'm not in a position to answer that question, that in
21 itself is an answer and that's fine.

22 No one is going to get here with one of
23 these witnesses and say: Well, you don't have a Ph.D.
24 in something so you can't explain this in minute detail
25 the way we do with expert witnesses. But I think it is

1 important and I support Ms. Blastorah wholeheartedly in
2 her suggestion that that is a valid enquiry.

3 And I might add that Mr. Martel asked
4 that question a couple of times in the satellite
5 hearings with respect to a couple of the witnesses, and
6 it was from whence that question that Mr. Martel raised
7 that I in fact got the idea.

8 MS. BLASTORAH: Mrs. Koven, perhaps if I
9 could just add to Mr. Cassidy's. If the Board's
10 concern was that we were going to conduct some kind of
11 an aggressive cross-examination of people who are put
12 forward as lay witness with regard to scientific
13 theories, that certainly isn't my intent.

14 MR. CASSIDY: Nor is it mine.

15 MS. BLASTORAH: My intent is simply to
16 clarify the basis on which those statements in the
17 witness statement are made, that's all.

18 MADAM CHAIR: No, I think Mr. Martel and
19 I don't have any problem with that, but I think it's
20 the idea that in each issue that was sort of prefaced
21 with the idea that there should be some scientific
22 basis. I can certainly see you asking if there is any.

23 MS. BLASTORAH: That was my intent, but
24 obviously if they are saying there is some scientific
25 basis and they are in a position to address it, we

1 would have some questions on that.

2 If they are saying there is a scientific
3 basis, then clearly they are, to some extent, be it
4 limited or otherwise, in a position to respond to those
5 questions, and they are put forward as witnesses for
6 Forests for Tomorrow.

7 Now, in many of the interrogatories we
8 have been referred to other panels and in some cases I
9 will be holding my questions that I might have put to
10 these witnesses to other panels where experts are being
11 called. But I think it's, again, incumbent on me to
12 clarify with the witness if that is the basis on which
13 they're making their statement.

14 MADAM CHAIR: All right. Are your
15 witnesses prepared for that, Mr. Lindgren?

16 MR. LINDGREN: Well, to a certain extent
17 they have been. They are recipients of those kinds of
18 questions already through the interrogatory process,
19 and they've answered interrogatories to the best of
20 their abilities.

21 If they need -- if the parties need
22 further clarification as to the basis of the
23 dissatisfaction with the timber management planning
24 process, then they are certainly free to seek that
25 clarification from the witnesses when they are

1 available.

2 MADAM CHAIR: Fine, thank you. And just
3 a final point, Mr. Lindgren. Did the photos for David
4 Oliver's witness statement, were they ever filed with
5 us?

6 MR. LINDGREN: No, they haven't, Madam
7 Chair, they are still up at --

8 MADAM CHAIR: Okay, thank you. That is
9 all the Board has to say about this witness statement.

10 Ms. Seaborn?

11 MS. SEABORN: I'll let Mr. Lindgren go
12 ahead, Madam Chair. There's just one comment I wanted
13 to make in relation to the clarification you sought
14 from Mr. Lindgren concerning bump-up, and perhaps I
15 will speak to that after Mr. Lindgren's finished.

16 MADAM CHAIR: All right.

17 MR. LINDGREN: The issue that I would
18 raise, Madam Chair, is the issue of an undertaking that
19 was provided by the Ministry of Natural Resources at
20 the Sault Ste. Marie satellite hearing, and that was an
21 undertaking I think that stems from Mr. Martel's
22 question about the size of clearcuts in the Peschu Lake
23 Crown Management Unit and, in particular, I think there
24 was reference to Havrot Township and that, of course,
25 is relevant to the evidence to be adduced by Mr. Mark

1 Robinson and perhaps Ms. Blastorah might be in a
2 possible to advise us as to the status of the answer to
3 that undertaking?

4 MS. BLASTORAH: I will need some
5 clarification as to how it relates exactly. I think -
6 but I haven't in the last two weeks, in all honesty,
7 have not spoken to the people who are preparing the
8 answer to that undertaking.

9 I know that steps were taken immediately
10 following the hearing at Sault Ste. Marie to get that
11 underway and some work has been done on that, I'm not
12 exactly sure of the status of that.

13 As the Board may recall, it involved a
14 mapping exercise and we suggested something like
15 clearcutting type mapping might be done and so on.
16 That's a fairly formiddable task, as the Board may
17 appreciate, and I'm just not sure of the status of
18 that. I will have to check.

19 Perhaps if Mr. Lindgren could give me
20 some more information as to how he feels that it ties
21 in, that would assist me in determining whether what we
22 have prepared so far would be of assistance.

23 MADAM CHAIR: Have you discussed this
24 matter before with Ms. Blastorah?

25 MR. LINDGREN: I will discuss it after

1 the scoping session.

2 MS. BLASTORAH: It wasn't raised with me
3 before.

4 MADAM CHAIR: Do you have anything, Ms.
5 Blastorah, that you wanted to have clarified?

6 MS. BLASTORAH: I think our concerns are
7 set out in our statement of issues. I don't think I
8 have anything particular. I have some few issues that
9 I mentioned to Mr. Lindgren with regard to items to be
10 used in cross, and I indicated I would discuss those
11 with him after the scoping tonight.

12 MADAM CHAIR: Mr. Cassidy?

13 MR. CASSIDY: I have nothing further in
14 respect of this witness statement.

15 Perhaps what I might request though in
16 respect of the scoping session and deadline for
17 statement of issues for Panel 3; is the Board in a
18 position to advise us of any scheduling on that at the
19 present time?

20 MADAM CHAIR: No, we can set a date now,
21 if it's agreeable with Ms. Swenarchuk -- is that
22 your --

23 What date do you think we'll be finished,
24 Mr. Lindgren, with Panel 2?

25 MR. LINDGREN: With Mr. Cappell scheduled

1 for the 29th, I think we'll be finished the 29th or the
2 30th of October.

3 ---Discussion off the record

4 MADAM CHAIR: Mr. Martel and I are
5 looking at next Wednesday the 24th. Do the parties
6 have any objections? Is that enough time to prepare
7 your statements of issue?

8 MS. BLASTORAH: Unfortunately, Mrs.
9 Koven, Mr. Freidin is doing that panel and he's not
10 here, so I'll have to confirm with him whether that
11 allows him adequate time. As you're aware, he's been
12 doing Panel 1, so I'm not sure whether that allows him
13 enough time or not.

14 Perhaps I could advise the Board or have
15 Mr. Freidin advise the Board tomorrow morning.

16 MADAM CHAIR: How does that look for you,
17 Ms. Swenarchuk?

18 MS. SWENARCHUK: That's fine. I just
19 wanted to remind the parties that Mr. Merrick, who is
20 the witness on Panel 3, will first testify probably for
21 about two days to the direct evidence of the witness
22 statement No. 3 for Forests for Tomorrow and he will
23 then testify immediately after to the issues of the
24 Beardmore-Lake Nipigon Watchdog Society.

25 MADAM CHAIR: You're going to do his

1 direct examination together?

2 MS. SWENARCHUK: That's right. And then
3 parties can cross-examine on both. So I would estimate
4 his evidence will be probably about three days then,
5 Madam Chair.

6 MADAM CHAIR: Three days, beginning on
7 the 30th.

8 MS. SWENARCHUK: Probably the 30th, yes.

9 MADAM CHAIR: So that means we need the
10 statements of issue for both his witness statements by
11 the 22nd.

12 MS. SWENARCHUK: And do I take it that
13 again, Mr. Pascoe, will send a memo to all parties so
14 everyone has the date?

15 MADAM CHAIR: Yes. It hasn't worked
16 before, but we will try again.

17 MR. CASSIDY: Is the scoping session then
18 scheduled for the 24th, Madam Chair?

19 MADAM CHAIR: It's tentatively scheduled
20 for the 24th, unless Mr. Freidin has a really
21 convincing reason why it shouldn't be.

22 MS. BLASTORAH: I don't think it will be
23 a problem.

24 MADAM CHAIR: It will be October the 24th
25 and Mr. Pascoe will get something out very quickly to

1 the other parties.

2 MS. SWENARCHUK: I just ask that the
3 notice include the two witness statements to which Mr.
4 Merrick will testify.

5 MADAM CHAIR: Yes, thank you.

6 Anything else, Mr. Lindgren?

7 MR. LINDGREN: No, Madam Chair, but I
8 believe Ms. Seaborn had another matter.

9 MADAM CHAIR: Ms. Seaborn?

10 MS. SEABORN: Madam Chair, in relation to
11 the issue of bump-up, I thought it might be helpful to
12 the Board if I just made a couple of comments now in
13 light of the fact that you have asked Mr. Lindgren's
14 witnesses to advise as to whether or not they've heard
15 anything from the Minister of the Environment.

16 Some of the witnesses have indicated in
17 their witness statements that not only that the
18 Minister hasn't made a final determination as to the
19 status of their request, but also that they're
20 concerned about the length of time that has passed
21 since the requests were made, and what I would really
22 like to say to the Board on this point is that no one
23 is happy about the length of time that it has taken to
24 respond to these requests.

25 Unfortunately the four requests that are

1 referred to in the witness statement are still
2 outstanding. What I can tell the Board is that since
3 the change in Minister, this issue has been flagged as
4 a priority. We certainly through our involvement in
5 the hearing and officials at MOE have briefed the
6 Minister on the fact that there are these outstanding
7 bump-up requests.

8 In relation to the four that are referred
9 to in the witness statement, two of them in early
10 September went to the Environmental Assessment Advisory
11 Committee for their review. Those are the requests
12 that are referred to in Document No. 1 which is Mr.
13 Tunnacliffe's statement, Marceau Lake Cottagers
14 Association, and the second request that has been
15 referred to EAAC is the Magasin Lake Area request which
16 is referred to in Document 4, and that is Mr. Nixon's
17 statement.

18 I can only tell the Board that at this
19 point the other requests are being dealt with and that
20 I will certainly advise the Board as soon as the
21 Minister makes her decision in relation to these
22 requests, and at this point that is the best that we
23 can do in the circumstances.

24 But I did want the Board to be aware that
25 it is the Ministry of the Environment's position that

1 the Ministry, and no doubt a number of the intervenors
2 at this hearing, not just Forests for Tomorrow but
3 other intervenors, I expect, are not happy with the
4 amount of time that these requests have taken to be
5 processed.

6 MADAM CHAIR: Thank you, Ms. Seaborn.

7 MR. LINDGREN: If I could ask Ms. Seaborn
8 one question of clarification. You refer to the
9 Tunnacliffe and Nixon witness statements and suggested
10 that the two matters have been referred to EAAC for its
11 review. Are you saying that the EAAC review on those
12 two matters is going to proceed?

13 MS. SEABORN: All I know, Madam Chair, is
14 that - and it's not the existing Minister of the
15 Environment, the former Minister of the Environment
16 referred those two bump-up requests to EAAC.

17 As the Board is no doubt aware, normally
18 what happens is a recommendation comes from EAAC back
19 to the Minister and then the Minister -- I believe the
20 Minister will take her position. I can do no more than
21 tell Mr. Lindgren that they are in the hands of EAAC.

22 MR. LINDGREN: And the second -- I guess
23 the final question is, with respect to the Nixon
24 matter, his original individual designation request
25 referred to not only the Sault Ste. Marie District but

1 to the Chapleau and Blind River District as well, and
2 it's his understanding and our understanding that at
3 this point the EAAC referral only pertains to the Sault
4 Ste. Marie District; is that your understanding?

5 MS. SEABORN: Yes, it is.

6 MR. LINDGREN: And is there a reason for
7 that?

8 MS. SEABORN: Well, Mr. Lindgren, I don't
9 think you can cross-examine me on this point. No, I
10 can't give any other information other than that. I
11 know that it's only in relation to the Sault Ste. Marie
12 Timber Management Plan that has been referred to EAAC.

13 MR. LINDGREN: Those are my comments,
14 Madam Chair.

15 MADAM CHAIR: Thank you, Mr. Lindgren
16 Thank you, Ms. Seaborn.

17 The Board will adjourn now until nine
18 o'clock tomorrow morning.

19 ---Whereupon the hearing adjourned at 4:30 p.m., to be
20 reconvened on Tuesday, October 16th, 1990,
commencing at 9:00 a.m.

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